

THE AUTOMOBILE

WEEKLY

NEW YORK—THURSDAY, MAY 2, 1907—CHICAGO

10 CENTS

"Firestone" Pneumatics

THE TIRES OF "STERLING QUALITY"
FOR ALL STANDARD RIMS

WHY

We are asking a better price than others
We are getting a better price than others

WHY

BECAUSE: There is a greater proportion of the higher quality rubber gum in "Firestone" Pneumatic Tires than in any other pneumatic tires on the market.

BECAUSE: Only the best and stoutest weave of high-grade cotton fabric (the other principal material) is used in "Firestone" Pneumatic Tires.

BECAUSE: Every tire is made by our slow and sure processes. No "short cuts"; nothing left to chance in making "Firestone" Pneumatic Tires.

Unvarying High Quality Yields Unvarying Good Service

As "Firestone" Side-Wire Solid Motor Tires are the recognized standard of the World for Commercial Motor Vehicles, so "Firestone" Pneumatic Tires represent the highest type of pleasure car tires.

The Largest Exclusive Rubber Tire Makers in America

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ENGINEERS, MANUFACTURERS AND ANALYSTS,
360 CHURCH AVENUE,
HARTFORD, CONN.

G. & D. DOWNS

HARTFORD, CONN. January 22, 1907.

The Hartford Rubber Works Co.,
Hartford, Conn.

Gentlemen:-

You have asked for my experience with the Midgley tread,
non-skid device, pneumatic tires.

To be brief, I can say that they are most satisfactory;
that the behavior of these tires on wet asphalt covered with slimy mud
and macadam roads with slippery surface is surprisingly good.

I have found it impossible, even with wilfully careless
driving, to cause them to skid to the slightest degree.

Yours very truly,
Henry Southern

The NON-SKID That Won't Come Off

¶ The extra cost of equipping
your car with the Midgley Tread
is trifling, when its advantages
are considered—certainly not an
item to deter the average auto-
mobile owner from possessing
the very latest and the best tire
equipment. Guaranteed on the
Midgley Universal Rim.

Write for Booklet.

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In "Round" Cases.

2 1/2 in. Auto Clock, \$26
3 1/2 in. " " " 28
3 1/2 in. Motor Clock, 24

8 Day High Grade Clocks

"BEST in the WORLD"

Clocks built with a view to stand the jars and jolts and
rough riding of Automobiles. Reputation the highest.

The "SPECIAL" Grades viz: { 2 1/2 in. "SPECIAL" Auto Clock, \$36
3 1/2 in. "SPECIAL" " " 34
3 1/2 in. "SPECIAL" Motor Clock, \$41
(Design of case patented Dec. 29, 1905.)

**YOU Own a Good Motor Car?
BUY THE BEST CLOCK.**

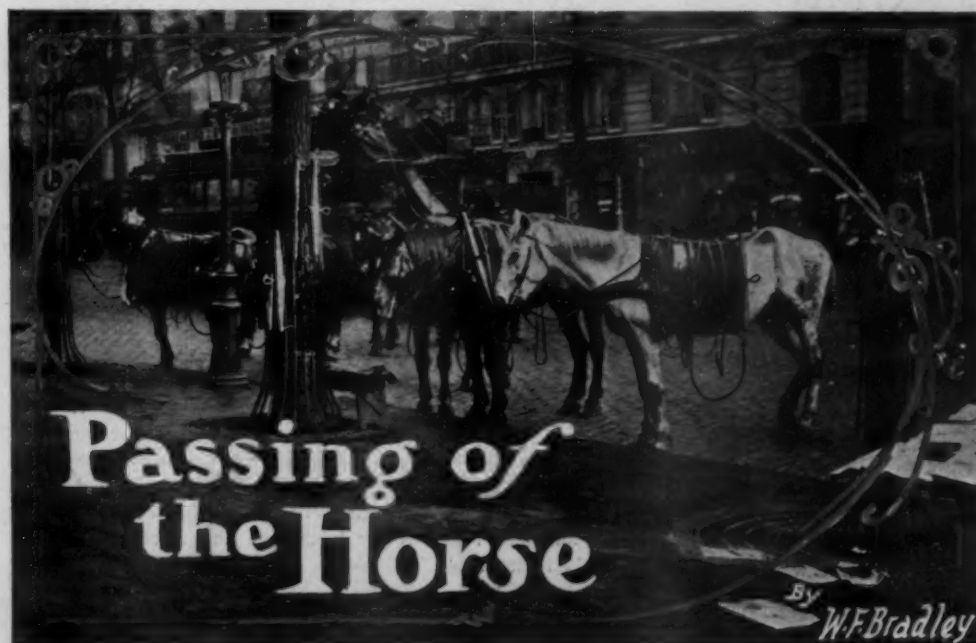
The sizes are the approximate diameter of
the Dials. All are in Duplex (patent applied
for) Polished Cast Brass Cases, the most
thoroughly waterproof case on the market.
The "Specials" show dial on angle; its clock
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Outer case secured to dashboard by hidden
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strong, reliable clock, but the auto clocks
have a somewhat finer train. You want the
BEST? Ask for the "CHELSEA."

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THE AUTOMOBILE



COCOTTE is dying. Perhaps you have never heard of Cocotte and have no tears to shed or any tender feelings of sympathy which swell up in your breast on the news of her approaching demise. Or maybe you are one of those who met Cocotte in the bone—for she never had much flesh—and wrote indignant letters to the *Paris Herald* denouncing her heavy-handed taskmaster and received as sole reply to your wrathful epistle an intimation from some fire-eating Parisian that if there were whipped cab horses in Paris there were also lynched negroes in America. In either case you are not likely to be moved by the momentous announcement, "Cocotte is dying."

The Dumb Tragedy of the Paris Cab Horse.

Cocotte is important numerically, for does she not represent at least 30,000 of the hippomobile population of the world's automobile capital? She came from nobody knows where; she showed a little spirit on the wilds of the fortifications as she dragged a frame on wheels and a couple of men along at a rapid clip. She bolted twice, perhaps thrice, when the sights of the gay capital were new to her and cab shafts were a novelty. But for five years she jogged along at a leisurely pace, indifferent whether her load were a consignment of market produce or an operatic star and her elegant admirer. Finally, worn out with wanderings, beatings and scant oats, she went—well, we had better not ask where she went. The question might revive memories of a windy city in the West.

The burly individual who had tickled her ribs through rain and sunshine was allotted another and younger animal, which was also christened Cocotte, and the cycle of operations recommenced. The lordly *cocher* came from wild Auvergne, generally. His utterance of *Fouchtre alors* would remove any doubt on that

point, even if his features and burly form allowed of the question. His costume was varied: a shiny white hat in summer; a shiny black one in winter. Carpet slippers in summer; wooden sabots in winter. A shirt, a coat, and pants in summer; the same, with the addition of innumerable coats, rugs, capes, and hoods in winter. A stout whip always.

The first signs of the coming revolution were visible three years ago, when an automobile gasoline cab made its appearance and, with the taximeter as a guarantee, offered to carry whoever cared to mount for the same minimum fare as the hippomobile. The distance was shorter, but that was a detail.

A few months later 100 Renault cabs, two-cylinder engine, 8-10 horsepower, shaft drive, as the makers' description briefly

described them, were flitting all over the capital.

The real Parisian is not generally in a hurry and might not have deserted Cocotte and her mountaineer driver had there been no other inducement than a saving of time. To ride en auto was a big attraction, to ride en auto for about the same price as behind a horse was excellent; to ride en auto and see how much you owed as you traveled along and be able to dismiss your chauffeur when he became too costly, that was exquisite.

How a New Industry Sprang to Life.

The Renault Brothers were not allowed to long remain the sole furnishers of Paris auto cabs. In a few months, Panhard, Darracq, Bayard-Clément and a score of others were studying the details of a cheap vehicle which would run 365 days a year, could not be upset by a bungling driver and would never be seized with sudden and stupid immobility. Their efforts were successful, for, with mushroom growth, additions to the factories sprung up on a magnitude that indicated a desire to replace not only the Paris fleet of 10,000 horse cabs, but that of many a foreign city. At present there are five companies, the largest owning 1,000 cabs, the smallest 100, all in active operation in Paris. The passing of the horse, in this particular field, will



PLENTY OF TIME FOR REST.



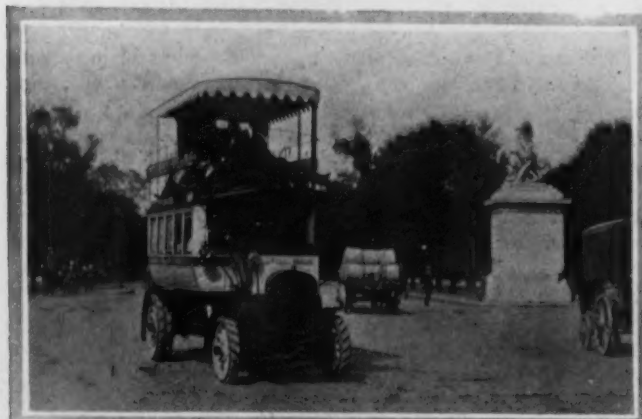
The noted
Paris Cabby
is losing
his job

take about two years more, by which time there will be about 8,000 automobile cabs in the city and a handful of horse vehicles for timid maiden ladies who were once young.

Stroll along the Champs-Élysées, the Avenue du Bois, the main boulevards and other quarters where cab circulation is intense, and you will almost be persuaded that the mechanical has already surpassed the equine in numerical value. The horse cab has been driven to the railroad stations and the more distant stands, where waiting jobs mingle with paying ones. The auto cab sticks to fashionable main thoroughfares, and is rarely on the waiting list.

The Revolution of the 'Bus System.

Ever travel on a Paris horse 'bus? If you have not, and you are anxious to indulge in that leisurely recreation, you must not delay your visit to Europe, for the horse 'bus, like the cab, is passing and passing rapidly. Had not old Madame C. G. O. a monopoly on this class of transportation the change would have taken place a few years ago. But there was no necessity to move, and consequently no one did move until one day it was remembered that the old lady's lease of life would expire shortly. Then 40-horsepower automobile 'buses were ordered and placed in service from east to west, where they had to compete with the sub-



Ponderous
Autobuses
are becoming
Numerous



way. Hilly Montmartre was next invaded, and the antiquated-looking individual who stood at the foot of the hill with the spare horse was put out of existence with one stroke. It was a sensation to the Parisian, used for long years to mount the steep grades at a snail's pace and occasionally get off to give a helping hand to the struggling beasts, to find themselves rushed up the slope at twelve miles an hour, with never a stop and never an encouraging shout or the crack of a whip.

In three years there will not be a horse-drawn 'bus in Paris. It requires no special wisdom to fix the date, for the present company's lease expires in 1910, and in June of that year 800 auto 'buses will replace the 700 horse vehicles, which, together with the hundred motor vehicles transport the traveling population of Paris. Darracq, the Napoleon of the motor world, is planning to control the 800 for a period of thirty-five years, and has already matured his plans for building, storing, and conducting his heavy brigade. The horse 'bus drivers have proved excellent chauffeurs. Some of them laid by the ribbons to take to the steering wheel with sore regret. You cannot drown the horse-love of a man in a day. But in a short time they were enthusiastic over their new charges and would not transfer to the old order, even if that were possible.

It is interesting to note that the first automobile 'buses to be used in Paris employ alcohol as a fuel. It does not appear, indeed, as if gasoline would have a chance to show its merits, for, if the Darracq-Serpollet Company obtains hold of the new lease, as is exceedingly probable, steam will be the successor. The present 'buses have four-cylinder engines, carried under the drivers' seat, ignition by high-tension magneto, and shaft drive through a special type of rear axle. The body is the one used on the horse vehicles with the addition of a permanent wood top. It is not likely that the company will convert its entire stock of vehicles, in view of the shortness of its life, but every month a certain number of horses are laid aside and mechanical power put in their place.

Passing from the Postal, Military and Municipal Service.

Electricity captivated the Paris postal authorities two or three years ago. The old way was to collect the mails from the numerous sub-offices by horse vans, which were generally sure, but never swift. The electric gave a quicker service and allowed the departure of mails to be fixed often two hours later than formerly. The horse is passing here, for a recent decree has gone forth that another big batch of horse-drawn vans must make way for the swift and silent electrics.

Down on the riverside, just behind the police headquarters, where unfashionable Paris unites every morning bearing the goods found on land and water the previous night, is the horseless fire station. There is no shining harness, no well-groomed steeds, no newly laid straw and plaited mats. In their place are three automobile fire engines ready at the first turn of the crank to rush off to the accompaniment of a monotonous hoo-hoo-hoo which is the delight of the small boy and the joy of the idler.

Nobody knows Paris who has not wandered through its streets by night as well as by day. Have you ever got up at five o'clock, or stayed up until that hour, and meandered along the boulevards when they are in the possession of the man with the hose pipe, the newspaper delivery van and the scavenger teams? Under the old system the latter consists of a two-horse team, a couple of men, a loud-voiced youth with a whip, and a couple of women. It is difficult to understand why a woman should enlist in such an unsavory expedition. Perhaps the team is a family affair in which case the woman would be a necessity on the French principle that the woman must always be at the head of the family business. From 5 to 9 o'clock they make their round, seizing the garbage cans laid out for them, emptying the contents into their cart, the operation accompanied by much cracking of whip, shouting to the horse, to one another, and to any passerby who is talkatively inclined. When the horse falls, as often happens in winter, he is lashed until he gets up, or until his companion falls by his side, when with more shouting and cursing the two are

unharnessed and invited to rise to the accompaniment of more cracking of the whip and persuasive phrases. The new method consists of a huge automobile wagon which swiftly moves along, two men in the vehicle to receive the cans, two men on foot to throw them up. The work is carried on so quickly that there is no time for wayside conversation with belated cabbies or wearied policemen. Clatter, clatter, go the cans, as they are flung up and as quickly tossed down. Before the horse team has finished a block the motor wagon is half a mile down the street, and when a calculation of the amount of work done is made it is found that the auto scavenger has accomplished as much as five horse teams.

Street Cleaning Up to Date.

The horse is having to move out of the street cleaning department. Formerly a lean horse drew a revolving brush through the streets. The brush had to be kept at work during the day, when streets were crowded with quickly-moving traffic. The leisurely vehicle caused a block in the entire street, for the fastest vehicles, unable to pass round, had to accommodate their speed to his. This was especially the case in the fashionable Avenue du Bois de Boulogne, where the traffic consisted either of rapid automobiles or elegant driving teams. A machine had to be devised which could sweep and water the road without



There's Much Time Saved in Post Collecting

blocking the traffic. The outcome was the creation of a special type of automobile street sweeper and water wagon.

The horse-drawn surface car, like the horse 'bus, is but the child of a monopoly. He has not yet entirely passed off the stage of busy every-day life, but his passage is so far advanced that it may be considered as an accomplished fact. Electric surface cars, steam cars, and finally the rapid automobile 'bus, have made him appear as antiquated as the dodo. In a few of the quiet quarters, which the globe-trotter never visits in his busy haste, the horse-drawn species draws to a close its long easy-going career. Nobody protests against the slow service, for all know that the horse is passing, and the Parisian has a heart for the antique.

Gasoline has entered the army. This is probably its greatest victory, for the military authorities are always the most conservative and are never known to take to a new idea until it has been thoroughly tried by private enterprise. Now, instead of conveying sick soldiers from the barracks to the hospital by horses, they are transported in rapid Panhard automobiles with bodies specially constructed for this work. Every private vehicle owes a certain amount of service to the army, and as horse vehicles are being replaced by mechanically-driven conveyances, the number of automobiles presenting themselves for service with the troops grows larger every year. A recent inspection at the Vincennes



For Street Cleaning the New Plan Excels

garrison, near Paris, brought up thirty or forty automobiles of a very nondescript character to be passed in review by Captain Genty, better known to the automobile public as De la Touloubre, the Grand Prix race driver. Among the drivers of the machines was Edmond, of the Renault racing team.

Business houses, the large stores in particular, were the first to realize the benefit of the automobile, and there is not a store of importance that has not a large percentage of its delivery service performed by electric or gasoline vehicles. Among small firms the increase has lately been on a rapid scale.

Owing to the changed conditions, new street regulations have been applied to the traffic in the Champs-Élysées. Motor vehicles are confined to the center portion, horse vehicles have to keep to the sides, both in ascending and descending. An advantage for the automobile which had never previously attracted attention has been brought to light by this arrangement. The centre track, used exclusively by motor vehicles, is always clean; the two side tracks, used by horse vehicles, requires constant sweeping. Already the center track has become too crowded for the cars, and the Parisian is amusing himself by speculations as to how M. Lépine will regulate traffic when the horse has gone.



Removing the Refuse from the Streets

SOME REMEDIES FOR ROADSIDE TROUBLES

By THE MAN AT THE WHEEL.

"LET me tell you, not to overlook a spare valve when you're on tour," interjected one of the group of chauffeurs who up to that time had been a silent listener to the conversation regarding emergency repairs and the value of spare parts. "Of course, there's not one chance in a good many that it will be needed, but that's the one you carry it for, and it doesn't take up much room. Last summer, we were on a long trip and one fine afternoon when we were many miles from nowhere, one of the exhaust valve stems broke clean in two where it was drilled to retain the spring. The governor, he was riled at the idea of being hung up somewhere to wait for a new one. What he doesn't know about a car would fill a library, but he thinks I could build one with a hammer and a jackknife, so he says to me: 'Of course, you can fix that easy enough, Jack.' I wasn't so sure of it myself, but I took both valves out of that cylinder—the fourth—plugged the intake with a piece of waste, and we drove on three. The boss didn't seem to notice the difference and thought I had fixed things already; he was telling the women folks what a fine, clever lad I was. I wasn't saying anything, just thinking hard, for I knew we had some stiff work ahead and there'd be trouble with only three cylinders working.

"I thought and thought, and decided it was a new valve or nothing half a dozen times over, and every time the question would come back, 'Where are you going to get it?' We made a small town early and decided to put up there, which favored me. As soon as I could make it, I hiked to the blacksmith shop to see what could be done. 'Weld it,' says the man with the leather apron right off. But it didn't appeal to me at all; it meant three or four hours work drilling it and getting it back to the right length again with a file, and I knew the governor wanted to get away bright and early next day, so I said nay—a blacksmith's weld is not always a thing of beauty and I didn't feel just like spending half the night tinkering. He gave me up as a bad job and had no further suggestions, so I nosed around, still thinking hard. I found some odd pieces of stiff brass tubing lying around the bench and had an inspiration—some of it was just the size to slip over the valve stem with a good fit. The tinker had a good set of taps and dies and the rest was easy. I threaded the broken ends of the stem and tapped the tube, screwed the whole business together and drilled it for the spring end. It worked like a charm."

Stopping as a Symptom of Trouble.

"There are lots of rules and regulations handed out by the motor-wise on how to tell when there is something wrong with the engine; some of them are good, some bad, and more of them are hard for a new hand to remember," I overheard an experienced chauffeur telling some of his friends recently. "You can be dead certain that there's something wrong when she stops," he went on, "but there's a whole lot in noticing just how she died, and when you get wise to it, you'll wonder why you didn't think of it before. I make it a rule to always take it into account and it's a practice that has saved me lots of time on the road. If the engine shuts right off without any warning whatever, you can make up your mind right then and there that it's ignition trouble pure and simple—something has happened to cut off the 'juice.' Ninety-nine cases out of a hundred you'll find it's either a loose connection or a broken wire, and it's certainly wonderful how some connections will work loose no matter how carefully you tighten them up with the pliers.

"But when the engine begins to slow down and then pick up again and slow down some more, repeating that performance and running in starts and jerks, you have your choice of a weak battery or a partly plugged-up carbureter nozzle—of course, you have to take other things about the car into consideration in trying to make up your mind what the trouble happens to be; if

you know the accumulators haven't been recharged for a month or two past, there's little use of blaming the carbureter. But sometimes a dying battery will make the engine slow down gradually until she stops just about the same as the gasoline giving out will, though more often than not she'll turn up fine on what's left in the carbureter and then peter out within a minute or two as the last drop is used up. Fitful running, whether it ends up with a stop or not, usually means carbureter or fuel trouble somewhere along the line. There's a good deal to be learned about taking care of a motor that isn't in the books, and watching how she comes to a stop is one of them that you can only learn by experience."

To Prevent the Trembler Blade Sticking.

Correct adjustment of the coil tremblers is out of the question after the platinum points become pitted owing to the irregularity of the surfaces left by the action of the current. If badly eaten away, as is apt to be the case after long service, the only remedy is a complete renewal, but if the trouble be still in its earliest stages, trueing up will usually suffice. Starting with the points in good condition, it will be found that trouble from this source can be avoided to a very great extent by reversing the direction of the primary current at stated intervals, and autoists are coming to realize the benefit arising from this expedient more and more. This arises from the fact that the electrolytic action is always in the direction of current flow, the positive electrode or terminal being disintegrated by the passage of the current and a perceptible amount of the fused metal in a very finely divided state being deposited on the other terminal. Where the contact point on the trembler blade forms the positive terminal, finely divided platinum tends to deposit on the stationary or bridge point and vice versa, so that it will be evident that a reversal of the current flow will likewise reverse this action and to a large extent prevent the trouble that otherwise will arise from it sooner or later.

Carrying Accumulators on the Car.

While there is usually nothing fragile about an accumulator and its component parts are not over easily broken, it will be found a wise precaution to carry it on the car as if such were the case. It should not be rigidly fastened to any part of the car, but rather should be packed with some springy, yielding material that will absorb the greater part of the shocks due to jolting over the road, as well as the more or less constant vibration to which it is subjected. The reason for this does not arise from any motive of cleanliness, as the matter of spilling electrolyte is taken care of in the majority of cases by patented devices which permit the escape of the hydrogen, but prevent the acid from being shaken out through the vent. The greatest danger arises from the possibility of loosening the active material from the plates. True, this is forced into lockpockets under great pressure, but it must at the same time be porous in order to be efficient, and in trying to attain both extremes, the maker has to halt at some middle ground. It is safe to say that there is no accumulator made the plates of which will not suffer to a greater or less extent from being subjected to a constant pounding and shaking about. When sufficient of the active material has been loosened and fallen to the bottom of the cell to reach to the bottoms of the plates, the cell will be short-circuited and put out of action. It seems rather superfluous to add that in addition to the precaution of thus carrying the accumulator, no loose tools or pieces of metal should be permitted in the same case with it, but investigation of any number of cars sometimes reveals startling conditions in this as well as other respects. Some makers guarantee that their cells will not be injured by being placed on a dead short-circuit, but even accepting this at its face value, it will be found better to exclude screwdrivers and loose metal from the battery box.



BETWEEN New York and Boston there is some 250 miles of road which alternates from good to bad and bad to good with annoying frequency. Sometimes it becomes very bad; torn up by trolley-line builders or for the purposes of sewers and other street work. If there were a highway for automobiles—and one will be built in the not distant future—one could travel from Madison Square to the Common at speed equal to that of the "Mayflower Limited," and more healthfully and enjoyably, and at a schedule of your own choosing.

'Tis not so very long ago that the Automobile Club of America promoted an endurance run between the two towns and allowed three days for the journey each way. Searchlights which showed the road ahead in reassuring manner had yet to reach general use, and so there were night stops at New Haven and Springfield. That run supplied evidence that much harder tasks did not feaze the improving auto, which was rapidly making apparent its worth under conditions far from favorable.

There were four of us: Robbins, who drove; Van Cleve, whose long suit is publicity; Curry, who dips his pen in vitriol on occasion, and this editor, who blue-pencils more than he writes. Advocates of air-cooling have neglected the non-stop idea, and Robbins wanted to do a stunt of this sort with an Aerocar of this type, though it might be parenthetically injected that the same concern markets a water-cooled model. It follows naturally when one wants to avoid undue risk of stopping the engine that he drives with a greater caution than is the case when speed is the prime requisite.

A few straggling, late, home-going citizens curiously watched the flashlighting of the car and its quartette of occupants, taken at the corner of Broadway and Seventy-third street, and at 1:15 A.M. we turned northward, thoroughly awake and aware that a cheerless dawn was to be found somewhere in Connecticut. As we crossed the tracks of Amsterdam avenue at 110th street an inner tube gave up its life. It was a poor beginning. Again on our way, we were soon across Central bridge and rolling out Jerome avenue. Unannoyed by the overzealous "bike cop," we shortly struck the "Shore Road" and felt that the journey was actually begun.

Two black cats scurried across the road, and there was doubt expressed as to luck coming in the wake of such a pair. Humming musically, the motor dispelled any haunting fears, and we flew along, subdued by the raw night air, but inwardly confident of the ability of the pilot and his craft. New Rochelle, peacefully sleeping; Larchmont, sloping down to the Sound; aristocratic Mamaroneck and Rye—these fell to the rear. The milkman was

pursuing his early rounds as we sped through Port Chester, and policemen, wide-awake and watchful, were in plain sight.

A couple of miles more and we bade good-bye to the Empire State and entered the domain of the "Nutmeggers." Through Greenwich we caught a weird and ghostlike impression of the Soldiers' monument in front of the large stone church. Down "Put's Hill"—the one of the stone steps and scene of General Putnam's escape from the "Redcoats"—we went at a clip none too careful. Mianus, Stamford, Darien (where traps grow with suddenness in springtime), Norwalk, and Southport—all looked familiar in the coming of the cold, gray dawn. Someone tried a joke about something or other, but only the alleged humorist laughed after the telling. One doesn't indulge in plenteous laughter at break-o'-day traveling the open road on a sunless morn of a backward spring. I must ask Van Cleve to try his funny story under more propitious circumstances.

But the truth must be told. Robbins was having some trouble with the engine. It was baffling; the throttle acted contrary—advanced, it refused to give additional compression pressure and obstinately stuck. After the non-plussed operator had allowed his motor to come to a painful halt, and all of us had indulged in a few choice expletives, it was discovered that a measley little set screw holding the lever had become loose.

Before was Bridgeport; we had covered fifty-eight miles, and it was 5 o'clock. Yes, we would breakfast at New Haven, and then hold a council of war with full stomachs. Humanity was getting up now, and the road that led to Yale Common gained in activity as we neared the town of the classic elms. Though the New Haven House couldn't supply the finnan haddie for which Robbins craved, the breakfast left us in a more optimistic mood. The vote to continue and try for a one-stop score was unanimous. We had come eighty miles; Hartford was straight ahead forty-two miles; Boston lay some 124 miles beyond Connecticut's capital. Over an hour had been taken for the leisurely eating of the first meal of the day, and the hands of the clock pointed at 8:10 as we turned out Temple street.

Wallingford streets were filled with loitering schoolboys, reluctantly responding to the call of the imperative bell that meant an innings of instruction. Meriden was energetically at work as Robbins carefully steered through its busy thoroughfares, considerate of other users of the road, and making speed only when traffic conditions

made it safely possible. If all drove the way Robbins did during that long day there would be slight and then unfair antagonism from those who divide the road with the autoists. Frightened horses during the entire trip could be counted upon a single hand, and none of these were much more than merely excited.



CROSSING THE CONNECTICUT.



ONLY A STOP FOR A NEW ENGLAND SNAPSHOT.

Old Sol poked through the clouds as we entered New Britain, the home of the air-cooled Corbin. A practical sight met our eyes and reminded us that the thrifty New England housewife was at her spring cleaning. The engine of a Ford runabout, located in front of a spacious mansion, was supplying the power for a vacuum cleaner.

Hartford looked picturesque as we neared, the Glastenbury Range contributing to the inviting scene. Following the trolleys into Farmington avenue, we passed the house in the building of which Mark Twain placed the kitchen so that it looks out upon the avenue. His explanation was that it would save time for his servants in giving them constant opportunity of seeing all that was going on. Then it would be unnecessary for them to go through the entire house and peek through the blinds.

Emerging from Hartford, we were soon in sight of the placid and broad Connecticut, majestically winding its way to the sea. At Windsor Locks we crossed the river, and that which one sees from here to Springfield is typically colonial and restful, far from the madding throng. A stretch of sandy road gives your motor something to do, but ours was on its good behavior, and it never uttered a protest, as if anxious to make amends for the stop before Bridgeport, for which it was not to blame.

It is certainly beautiful country between Springfield and Worcester. Palmer was our lunching place, and we wasted the greater part of an hour. Sure enough, going through Leicester, there stood the famous auto deputies, watches in hand, and spectators on both sides of the street grinning unmistakably to see if we were to be victims of the limbs of the law. No, we were "wise," and crawled through the trap at a funeral pace. "Jim" Quinn was not on duty, and so we slid down into Worcester without a sight of that worthy.

Roads of the real kind carried us along at a pleasing clip. 'Twas 3:30 as we scurried through Marlboro, and once more we saw the schoolboy, and this time he was gleefully escaping from the house of learning. There was no call for us at the "Wayside Inn" in South Sudbury, but Curry reminded us that it was the old hostelry made famous by Hawthorne in his "Tales of a Wayside Inn." The A. C. A. signs were mighty helpful in going through Waltham and finally reaching the beginning of Boston's great park system, superior to anything possessed by any other city. Exactly 5 o'clock on the hour was the time of our arrival in front of "Pop" Lowe's in Tremont street, and, of course, he and a contingent of newspapermen were there to say "Hello!" Our net time for the run was about twelve hours, and in refreshment for men and machine and the tire and single stop incident three hours thirty minutes had been consumed. Nothing startling! No, nothing startling, except to demonstrate how the Boston-New York trip can be done without undue exertion in much less than a day where once the daylight of three days were thought necessary. And over that autoway of the near future the jaunt will be one of less than five hours.

* * * *

It bore the appearance of rain on Wednesday morning, and Curry and I took train back to New York. Not so with Robbins and Van Cleve. They wanted to have another, and the pilot hungered to do the job without a stop of the engine. Starting Thursday at 9 A.M., and blessed with daylight until Larchmont was reached, the air-cooler reported at Broadway and Seventy-third street at 8:23 P.M. This meant a total time of 11 hours 23 minutes, and the net figures were 9 hours 23 minutes. It ought to be mentioned that this Model D was the same one which ploughed over the snow and mud-soaked roads between the two cities in March last at the time of the Boston Show.

The use of special steels for rivets was the subject of a communication to the Paris Academy of Sciences lately by M. G. Charpy. A systematic study of the thermal and mechanical properties of various alloys of steel has led to the use of a chrome-nickel steel for rivets, the strength of which is 2.5 times that of the metal usually employed for this purpose, and this without the need of any special precautions in practical use.

THE AUTOMOBILE CALENDAR. AMERICAN.

Shows and Meetings.

- May 28-31.....—Indianapolis, Ind., Annual Meeting American Society of Mechanical Engineers.
- Oct. 31-Nov. 7...—New York City, Madison Square Garden, Eighth Annual Automobile Show, Association of Licensed Automobile Manufacturers.
- Nov. 30-Dec. 7...—Chicago, Coliseum and First Regt. Armory, Eighth Annual National Automobile Show, National Association of Automobile Manufacturers.

Races, Hill-Climbs, etc.

- May 6-7.....—Harrisburg, Pa., Two-day Endurance Run, Motor Club of Harrisburg.
- May 30.....—Philadelphia, Hill Climb, Monk's Hill, Quaker City Motor Club.
- May 30.....—Chicago, Memorial Day Race Meet of the Chicago Motor Club.
- May 30.....—Bridgeport, Conn., Hill Climb, Bridgeport Automobile Club.
- May 30-June 1...—Newark, N. J., Three-day Endurance Run of the New Jersey Automobile and Motor Club.
- June 12.....—National Orphans' Day, instituted by the American Automobile Association.
- June 19-22.....—New York City, Sealed Bonnet Contest, under the auspices of the Automobile Club of America.
- June 20.....—Albany, N. Y., Annual Tour of the Albany Automobile Club; Route, via New York and Asbury Park, to Atlantic City.
- July 10.....—Cleveland, O., Start of Fourth Annual Tour of the American Automobile Association, for the Glidden Trophy. Finishes in New York City on or about July 23.
- Sept. 14.....—Albany, N. Y., Road Race under the auspices of the Albany Automobile Club.
- Oct. 19.....—St. Louis, Mo., International Aerial Race of the Gordon Bennett Prize. Aero Club of America.

FOREIGN.

Shows.

- May 4-15.....—Madrid, Spain, Automobile Exhibition, Palace of Fine Arts, Royal Automobile Club of Madrid.
- May 15-26.....—Zurich, Third Annual Swiss Automobile Show.
- June 25-30.....—St. Petersburg, Russia, Automobile Show.
- Nov. 12-Dec. 1...—Paris, Exposition Decennale de l'Automobile, Grand Palais, Esplanade des Invalides, Automobile Club of France.

Races, Hill-Climbs, etc.

- May 15-31.....—Belgium, Industrial Vehicle Trials, Automobile Club du Nord.
- May 18-21.....—Milan, Italy, Touring Club Trials.
- May 22-25.....—Irish Automobile Club Reliability Trials.
- May 24-27.....—Voiturette Contest, Automobile Club of Austria.
- May 28.....—Isle of Man, Tourist Trophy Race, Automobile Club of Great Britain and Ireland.
- May 30.....—Isle of Man, Heavy Touring Car Race, Automobile Club of Great Britain and Ireland.
- June 3-12.....—Paris, Electric Vehicle Competition, Automobile Club of France.
- June 8-12.....—Herkomer Cup, Automobile Club of Bavaria.
- June 14.....—German Emperor's Cup, Taunus Circuit, Imperial Automobile Club.
- June 20-22.....—American Gold Cup, Start from New York of European Tour for American Cars, Georges Dupuy, secretary, 1402 Broadway, New York City.
- June 14-20.....—Scottish Reliability Trial, Scottish Automobile Club.
- July 2.....—Grand Prix, Automobile Club of France.
- July 14, 1908....—Paris to London, Aerial Race.
- July 15-18.....—Ostend Week, Record Trials, Automobile Club of Belgium.
- July 21.....—Ardennes Circuit (Belgium).
- July 31.....—Liederkerke Cup for Touring Cars, Ardennes Circuit, Belgium.
- July 31-Aug. 8...—Belgium Regularity Contest for Touring Cars, A. C. of Belgium.
- August 1-7.....—Criterium of France, 1,750 Miles Touring Competition and 250-mile Race for the Press Cup, A. C. of France.
- August 11-20....—France, Coupe de Auvergne.
- Sept. 1.....—Italy, Brescia Circuit, Florio Cup, A. C. of Italy.

FROM BOTH SIDES OF THE SELDEN PATENT FENCE

FROM A. L. A. M. PUBLICITY BUREAU

SELDEN ACTION AGAINST INFRINGERS.

The spirit of activity that has been noticeable at the offices of the Association of Licensed Automobile Manufacturers for the past few weeks, developed Friday in a manner that proves that the owners of the Selden patent are determined to bring the validity of this famous patent to an early decision. Suits were instituted against nine infringing manufacturers or their representatives who are located in New York. The action of the owners of the Selden patent in bringing these new suits caused considerable uneasiness on the part of the dealers or representatives of the infringing manufacturers, as in some cases they did not know to what extent the manufacturers would protect them in this matter.

It had been understood for some time that the so-called test case against the Ford Motor Company, as manufacturer; John Wanamaker, as dealer, and O. J. Gude, as user, would be the only suit against the manufacturers of automobiles, not licensed under the Selden patent, so that these new actions caused no little surprise and consternation among the local automobile fraternity. Papers were served on the dealers or manufacturers of the following unlicensed cars: Maxwell, Mitchell, Aerocar, Rambler, Rainier, Premier, Marmon, Stoddard-Dayton and National.

Why so many suits should be brought at this time was the cause of much speculation, but it has been learned there were various causes; among others, it appears that the bringing of the large number of suits before the decision of the so-called test cases is frequently resorted to in order that such suits may be in condition for prompt action immediately upon the entering of the main decree sustaining the patent.

At the same time, it would seem as if the principal cause was the attempt of some infringers to leave the Federal jurisdiction in which the main suits under the Selden patent were being prosecuted. In this connection, for several months past it has been known that an unlicensed manufacturer near New York City had purchased a factory site in the West, and would, as soon as possible, remove his entire plant. While this action was publicly attributed to his finding better factory facilities in the West, and also better labor conditions, as well as several other excuses, it is understood now that those in his confidence learned from the manufacturer in question that the main object was to leave the jurisdiction of the Federal Circuit Court in which he believed there would be, at an early date, a favorable decision under the Selden patent.

It appears also that in the last few months there has been a considerable reduction in the number of direct representatives of unlicensed automobiles, and that on the other hand the unlicensed cars still being handled in New York have been sold by individuals or companies organized solely for selling, with no legal connection with the factory as exists in other cases where branch houses are established.

The bringing of many suits under the Selden patent, it is said, will enable the owners of those rights to take summary action immediately after the filing of the decision sustaining the patent in the so-called test case. On the other hand, it is also stated that unlicensed dealers have been persuading the buying public that they need not respect the Selden patent, and, in fact, it is frankly stated that there appears to be so much ignorance on the part of infringers whether manufacturers, or users, that the only safe course was found to be in the serving of papers to impress upon the unlicensed dealers and manufacturers the proper realization of their unlawful business. It is calculated the bringing of these suits, among other things, will stop misinformed

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FROM FORD MOTOR CO. PRESS BUREAU.

WHAT HENRY FORD HAS TO SAY IN REPLY.

Henry Ford, president of the Ford Motor Company, which has been fighting the alleged Selden patent for the past four years, was interviewed over the long-distance 'phone Saturday on the move. He was at the factory in Detroit. Among other things, Mr. Ford said:

"The press notice that the Association of Licensed Automobile Manufacturers has undertaken to sue some more manufacturers, is a fitting climax to some of their other childlike acts during the past few months. Driven to desperation by the unexpected developments and the exposure of their weak structure, nothing else was to be expected but a move of this kind. When nothing substantial can be shown, the officers of the A. L. A. M. seem ever ready to start suits against some small dealer. It is a pitiable state of affairs and shows that the predictions of the Licensed Association going to smash within the next few months seems likely to prove true.

"The ingeniously built structure that proposed to have a monopoly of motor car manufacture and boost prices accordingly, is nearing its end. The promised monopoly has failed to materialize, some eighty good manufacturers declining to pay royalty, while only thirty-two continue to give up money, although I understand many of these have stopped payments recently. Trust methods have failed to produce results, as the Association was too weak.

"Many things have occurred recently to make this latest move an expected one. Instead of continuing to fight with the Ford Company on which they started, they now try to annoy some New York dealers who happen to handle cars not made by their members. I notice that they didn't talk of serving the big manufacturers themselves. Even in New York, they don't go near the American Locomotive Company, for they look too big.

"I take it that the Licensed Association did not relish the exposure at the trial of the Searchmont Company against them which showed the tremendous sums paid in royalties, of which almost half, amounting to \$228,342, went to the lawyers. It was a soft pension fund for gentlemen like Messrs. Cuntz, Reading, Betts, and other attorneys and friends of the Electric Vehicle Company, which gets three-fifths of the royalties free and clear, and of which George H. Day, the former manager of the Association and the man who conceived it, was president. I understand, however, that Mr. Day has not been interested in the Electric Vehicle Company since the Licensed Association was formed.

"Other matters that have hurt the Licensed Association recently, was the exposure of the salaries and other expenses, amounting to \$223,902; the \$25 a day given to everyone who attends the frequent meetings held of the dozen committees; the fact that the much vaunted laboratory consists of a corner of Mr. Souther's laboratory in Hartford, for which a thousand dollars a year is paid, as Mr. Cutler testified. The movement of the twenty-five or more independent importers to organize against the seven or eight in the licensed association, didn't create the best of feeling among the latter, especially when it was known that they were trying to supply the importers with a date for their show during the holidays, which it is well known is the poorest time of the year. The officers undoubtedly feel that their own importers would quit and that the constant turmoil in which their present members move, would bring an outburst.

"I don't suppose the members who have been giving up good money like to be tricked by Mr. Selden himself, who bought the Buffalo Gasolene Motor Company in order to secure a license when one was refused him. Then the refusal of some of the

(Continued on second column, page 736.)

(Continued from first column, page 735)

automobile buyers from believing themselves safe in buying unlicensed gasoline automobiles. It is pointed out that there is a penalty for infringement of the Selden patent as well as every other patent, not alone by the manufacturers of an infringing article, but likewise for the sale of the article and the use, as in the case of owning and operating an automobile. While the hardest fought suits are now generally understood to be pending against manufacturers, the suits just brought are directed against a large number of agents or dealers and it is understood that the other thirty suits have been brought against individuals owning unlicensed cars. This would seem to indicate the general program to stamp out, root and branch, the manufacture and traffic of unlicensed cars infringing the exclusive rights granted by the United States Government when the pioneer Selden patent was issued.

FROM A. L. A. M. PUBLICITY BUREAU, APRIL 29.

SELDENITES BRING SIX MORE SUITS.

Following up the nine suits against the manufacture or sale of unlicensed cars comes the report that actions against six other unlicensed concerns were begun. Suits were filed and papers served against dealers in, and the manufacture of the following unlicensed cars: American Mors, DeLuxe, Wayne, Glide, Dragon and Welch.

The activity of the owners of the basic patent which covers broadly the manufacture, sale or use of gasoline automobiles, has come to many as a great surprise, especially to dealers or representatives of the manufacturers of the nine unlicensed cars which were sued yesterday. To some of these it did not appear that any importance was attached to the proceedings, as their manufacturers would undoubtedly assume the responsibility, the dealers not realizing the liability they were assuming, and the penalty attached to the handling of an article that was an infringement. In this connection, from the decisions of the United States Court, in similar actions, it is manifest that the rights granted a patentee must be respected, and the overstepping of these rights are attended not only in awarding damages to the owners of the patent, but also all profits made in the traffic in an unlicensed car.

Referring to the Much Discussed De Feher Case.

The case in the Selden patent, known as the De Feher case, at the time of the granting of the decree and injunction attracted considerable attention. An attempt, however, was made to depreciate its significance, owing to the defendant's lack of contention, but Judge Holland's decree made it clear that the defendant had infringed, and awarded the owners of the Selden patent, not alone damages, but costs and profits, with interest on same, and a perpetual injunction restraining the defendant from the further traffic in the unlicensed product.

The prosecution of the suits that have just been brought will be pushed as speedily as consistent with the thorough preparation of the cases.

It has been pointed out that the cars whose representatives have been sued, with one exception, have been in existence only during the past few years, and that they did not market any product until after the formation of the Association of Licensed Automobile Manufacturers in 1903. A person associated with some of the automobile manufacturers for more than twelve years has even gone so far as to say that, with one or possibly two exceptions, the companies that have been sued came into the field when standards of construction had already been established by practically all of the manufacturers now comprising the Association of Licensed Automobile Manufacturers.

Any impression that the owners of the Selden patent would not endeavor to prosecute all infringers independent of the test case against the Ford Motor Company will be dispelled by the activity which is being shown.

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importers to pay royalties, the status of the Thomas '40' factory and the new factory for Buick runabouts, were among other things that are making the Association the laughing stock of the automobile and business world.

"Led on to an early show by the action of the Automobile Club of America and the American Motor Car Manufacturers' Association, they have got their date too early. The internal trouble undoubtedly resulted in the resignation of Mr. Day, a gentleman for whom personally I have the greatest respect.

"It is worth noting, too, that the independent organization, the American Motor Car Manufacturers' Association, of which we are proud to be a member, has doubled its strength during the last year, now numbering forty-two American concerns, or ten more than the licensed folks, and moreover, these makers are doing the greatest business, for they sell their goods at proper prices; are not induced to boost it to an abnormal figure in order to pay royalty, and consequently are patronized by the public. The so-called licensed folks have only secured two new members in a year, notwithstanding some extraordinary soliciting. So far as the alleged Selden patent is concerned, even their own members look upon it as a joke. Issued fifteen years after the original application was filed, it has never been considered seriously except as a foundation to keep the field of motor car manufacture in the hands of a limited few.

"Once upon a time a few people considered it as a serious thing, but of late it has been a huge joke among automobilists generally.

"It is a pity that even so desperate a combination as the licensed association should stoop to methods of this sort, but I presume it is a case of life or death. They will doubtless hold off a decision as long as possible, for on a decision they have everything to lose and nothing to gain.

"Some of the reasons given in the press notices sent out by the licensed association for this action against a number of manufacturers, are humorous in the extreme."

ATTORNEY PARKER ON THE SITUATION.

When seen yesterday, R. A. Parker, counsel for the Ford Motor Company and for the Panhard Company, said with reference to the statement in question:

"The statement to which my attention is called, I assert is beyond doubt one issued to the newspapers directly from the officers of the Licensed Association, so-called, in which they seek to stamp and characterize their own actions and state their own motives as though such actions and motives had been described and characterized by an impartial observer.

"The motive for putting this matter of bringing further suits before the public in the manner in question is very clear. It is done simply as one of the last desperate moves in the great game of bluff that the officials of the Licensed Association have been playing for the last four years. We remind them of Lincoln's famous saying, 'You can fool some of the people all of the time; you may fool all of the people some of the time, but you can't fool all of the people all of the time.'

"The public may be sure there is a crisis pending in that association, or these new actions would not be brought, and especially that they would not be heralded under such false colors.

"To a person having inside information, it would be quite a natural supposition that the suits were brought for the express purpose of using up in attorney fees, etc., the surplus of some \$160,000 or so which the Searchmont suit disclosed was still on hand in the treasury of the association after the payment of upward of \$225,000 in legal expenses. As the Searchmont case was brought to secure a division of this surplus or of any surplus, it would be natural for some parties connected with the association to divert it in other directions and leave nothing to divide."

ALCOHOL AS A FUEL FOR THE AUTOMOBILE MOTOR*

By THOMAS L. WHITE.

IN considering the possibilities of alcohol as a fuel for automobile motors, it is impossible to avoid alluding, however briefly, to the economic conditions which must eventually determine its use as a fuel at all, and this independently of all technical considerations. Gasoline is the by-product of a geographically limited and monopolistically controlled industry, and there are reasons to believe that the available supply is more than mortgaged by a world-wide and growing demand.

Alcohol is, one might say, the product of the four seasons. It can be manufactured from any vegetable substance which contains sugar or some material like starch, which is easily convertible into sugar. As to available supply, it can be and will be produced in unlimited quantities at a steadily diminishing cost. From corn-cobs it has already been experimentally prepared at five cents a gallon, and there seems little reason to doubt that if the technical problems connected with its use can only be solved, and if, also, what is important at the present moment, its use can be reduced to current practice; if, in other words, some means can be devised of economically burning this fuel in the thousands of automobile motors in existence to-day, there is little doubt that the demand so created will be satisfactorily met, both as to quality, quantity and price.

Passing now to the question of denaturing, it is gratifying to see that Mr. Yerkes has yielded to the pressure brought to bear on him, and has reduced the quantity of added methylene from ten to two per cent. This, however, is only a step in the right direction. When the use of alcohol in motors becomes more general, I think that the motor industry will be entitled to demand the same special consideration in the matter of a suitable denaturant as is now accorded to the chloroform, vinegar, ether, and other industries where the selection of a denaturant suitable to the needs of the case is permitted. So far as the motor industry is concerned something like this is already in force in Germany and Austria, where motor alcohol is distinguished from domestic alcohol, that is, alcohol for general purposes of heat, light, and fuel. If I might make a suggestion, I think that the revenue would be sufficiently safeguarded if alcohol destined for use in motors was saturated with acetylene gas with possibly the addition of a little acetone to facilitate its solution.

Methylene as a denaturant has the one commanding advantage in the eyes of the revenue officials, that by no means known to science can it be separated from ethyl alcohol. In the motor, however, it is a disadvantage in every way. Its action is corrosive, its calorific value is low and it is costly. The less of it the better. If alcohol must be nasty, let it, at any rate, be cheap.

To come now to the main subject of this paper, namely, the use of alcohol in existing motors working with a compression of four to one, or thereabouts, whose r.p.m. rate is high; before going further it is as well to briefly review, even at the risk of being considered trite, the essential facts with which we have to deal. They are:

- (1) Alcohol calls for six per cent. of its calorific value to completely evaporate it.
- (2) With ordinary compression the inflammation rate of the motor alcohol is sluggish compared to gasoline.
- (3) Alcohol containing ten per cent. of water is capable of very high compression (150 pounds upwards) without pre-ignition.
- (4) Alcohol in the process of inflammation does not radiate heat so rapidly as gasoline.
- (5) Expectation to the contrary, alcohol is most efficient as a fuel when the wall of the cylinder is maintained at a temperature of about 200° Fahr.
- (6) When alcohol is used as a fuel the penalty of incomplete combustion is not merely loss of efficiency in the motor, but the

corrosion and destruction of valve seats and other exposed parts due to the production of acetic acid, formaldehyde, and other deleterious compounds.

It is a well-known fact that the efficiency of an Otto cycle is a function of the compression ratio. It follows that in motors specially constructed for alcohol we should expect a very high thermal efficiency, and this expectation is borne out in practice. With the Deutz motor using a nine to one compression a thermal efficiency of over thirty-one per cent. has been obtained, which shares with the Diesel the distinction of being the high-water mark of efficiency for explosion engines. In the case of the automobile motor, however, the problem is to accept the compression ratio as a datum and to seek efficiency in other directions. This essentially means that the use of alcohol under such conditions is a carburetion problem.

Speaking generally of alcohol motors, carburetion practice falls naturally into two divisions.

(1) Motors, like the Deutz, which have a high compression and in which the alcohol is simply sprayed into the ingoing air just as it enters the cylinder, the hot cylinder walls and the heat generated by compression being relied on to complete the evaporation.

(2) Motors, like the Dürr, in which the compression ratio is moderate, say six to one, and in which a superheated mixture of air and alcohol vapor is produced by exhaust-heated baffles situated in the carbureter itself.

In both cases the motor cannot be started by hand. In the first case, because the hand compression is not rapid enough to evaporate the atomized charge in the cylinder; in the second case, because there is a precipitation of the volatilized alcohol on the cold cylinder walls.

In efficiency tests these two types come out about level. Thus in the Dürr motor the perfect carburetion offsets the lower weight of the mixture and the lower compression ratio, while in the Deutz motor the thermal gain due to greater compression is qualified by the fact that the evaporation in the cylinder is never complete and consequently part of the fuel is wasted thermally by being burnt late in the stroke or not at all.

It is clear that in automobile practice we must seek something in the line of complete carburetion, even at the expense of reduced charge weight, so that in order to produce efficiency under existing conditions of motor construction we must aim at:—

- (1) Perfect carburetion with the aid of the exhaust heat.
- (2) The acceleration of the rate of inflammation in the cylinder.
- (3) The maintenance of the cylinder walls at a temperature of about 200° Fahr.

Coming now to the actual phenomenon of combustion in the cylinder itself, it would seem that the slow inflammation rate of a mixture of alcohol vapor and air is a necessary corollary of the fact that such a mixture is susceptible of a high degree of compression without spontaneous ignition. It is, I think, now a recognized fact that when an inflammable mixture is ignited by a spark the propagation of the explosion is not due to direct consecutive ignition throughout the body of the gaseous mass, but to the successive compression to the self-ignition point of layers of gas immediately enclosing the inflamed nucleus at the moment considered. Now, if gasoline and air be ignited, the shell of gas surrounding the explosion focus has only to be compressed about five to one to spontaneously ignite throughout its extent. In the case of alcohol a much higher compression is necessary, so that the explosion acceleration is necessarily slower.

All commercial denatured alcohol contains ten per cent. of water, and the function of this water in the alcohol motor is practically an undetermined problem. There is reason to believe that the corrosive action so much complained of in alcohol motors is partly due to its presence, and it undoubtedly has something

* Paper read before the Society of Automobile Engineers.

to do with the high compression ratio. Of course, it is known that the presence of water in an inflammable mixture in a motor is not altogether a disadvantage. In the first place, combustion in the absolute absence of water is impossible. Thus phosphorus absolutely refuses to burn in pure oxygen. Then, again, we have the experiments of Banki and others, who have deliberately injected water into the cylinder during the compression stroke with a resulting increase of efficiency in the motor. I have not seen records of any experiments made with absolutely pure alcohol, but they would be decidedly interesting, if only as a guide. It is, however, generally believed that alcohol containing water is the better fuel.

In an address delivered last year, which is given in *extenso* in the *Scientific American*, Dugald Clerk showed that the development of the stationary motor shows a decrease of the heat loss into the water jacket and an increase of the heat loss into the exhaust. Indeed, what has been gained by the swings seems to have been lost on the roundabouts. Owing to its low radiative quality alcohol comes naturally into line with this tendency in modern practice. In fact, were it not for the necessity of maintaining a high cylinder wall temperature, the question of cooling an alcohol motor would be a simpler one than in the case of gasoline, as the actual amount of heat to be dealt with is less.

With regard to the chemical reactions which take place in an alcohol motor, there seems to be much doubt and much difference of opinion. As between French and German authorities there exists a sort of scientific Franco-German war. Thus, while on one hand we find Sorel, the French expert, attaching the greatest importance to the erosive effort of acetic acid formed by incomplete combustion, we have Fehrmann, the German expert, denying the existence of acetic acid altogether. Be this as it may, it seems to be a definitely ascertained fact that when the carburetion is incomplete, pitting of the inlet valve seat and the formation of an incrustation upon it result. As to what excess of air should be present seems largely to depend on the r.p.m. rate, and in this connection it should be remembered that the record efficiencies for the use of alcohol for motors have all been attained with a low r.p.m. rate, in some cases as low as 200.

One of the most mysterious phenomena of the explosion motor is heat suppression, or the addition of heat during the expansion stroke, so that the expansion curve remains above the adiabatic drawn between the same limits in spite of the fact that heat has been radiated all the time. This suppressed heat in the case of alcohol is, according to Sorel, greater than with a gas engine. So far as a comparison with gasoline is concerned, the advantage, judging from P. V. diagrams, appears to be slightly with alcohol.

It is now with some diffidence that I come to mention an attempted solution of the carburetion question due to Mr. Barker and myself. The two objects of our device are to carburete air with alcohol instantly and completely and to promote approximately instant inflammation at minimum compression in the motor. What we propose to do is to pass air containing partly atomized and partly vaporized alcohol through a layer of calcium carbide before such air enters the cylinder. A portion of the ten per cent. of water in the alcohol is taken up by the carbide and replaced by acetylene gas, and the heat of this reaction simultaneously vaporizes the alcohol. From the nature of its formation such a mixture of acetylene, alcohol vapor and air must necessarily be a very intimate one. In the cylinder we consequently have:—

(1) A well-diffused mixture.

(2) An endothermic compound in the form of acetylene, which contains heat over and above its thermal value and which spontaneously ignites at comparatively low pressures, so that when the mixture is fired the pressure set up round the spark plug causes the practically simultaneous detonation of the acetylene throughout the body of the alcohol.

Taking into consideration that the substitution of acetylene for water is a net gain calorifically, and that the elimination of this water will probably do away with much of the erosion complained of in alcohol motors, we hope to produce for the ordinary

automobile motor an alcohol-air-acetylene charge, whose characteristics thermally are not very different from those of a mixture of gasoline and air.

I had hoped to have had this apparatus running this week and to have been able to give actual figures of a trial run. There has, however, been some little delay in getting castings made, and although all the parts are now ready to be assembled and attached to De Dion motor coupled direct to a dynamo, we have not been able to get into running shape in time.

There is an impression in some quarters that alcohol has to some extent received a black eye in Europe. It would probably be more correct to say that, while with slow-going motors it has proved a great success, the development and perfection of the automobile motor have left little leisure to designers to study the alcohol problem with any thoroughness. In fact, it is more or less virgin forest, which the automobile engineer has to clear when he is dealing with the question of alcohol motors, and there is no reason whatever why America should not, with the resources which has been shown in other branches of engineering, lead the way. And if this happens, as I hope it will, the credit will be all the greater, for while in Europe gasoline is a heavily taxed import, in America it is an indigenous product.

ALCOHOL ENGINES IN SOUTH AFRICA.

According to the American Consul-General at Rio de Janeiro, the development of alcohol engines to take the place of engines in the United States as a result of the recent legislation for the use of denatured alcohol is watched with much interest in Brazil, says *Commercial Intelligence*. The manufacture of practical, simple and cheap alcohol motors similar to the motors now sold will, he thinks, meet a ready demand in Brazil. Gasoline is costly, and the difficulty of transporting it, passing it through the Customs, and caring for it afterwards, under very stringent regulations, has retarded the introduction of gasoline power in many lines. On the other hand, alcohol is cheap in Brazil, and most sugar-growing countries. Large quantities of it are exported, and immensely increased quantities could be made easily and cheaply, the present output being measured more by the demand for it than by the possibilities of production. The sugar alcohol in Brazil is used without any denaturing process. It comes in several grades, some of which are of too low degree to burn readily, but a demand for high-grade alcohol for power fuel or any similar purpose could and would be met quickly. Alcohol of export-grade has been shipped from Brazil in recent years at about 40 cents per gallon. The further development of the sugar industry, which is following increased demand for Brazilian sugar in Europe, will doubtless lead to the production of alcohol at a much lower cost. At present in Brazil it has few industrial uses.

HOW TO MAKE POLE-FINDING PAPER.

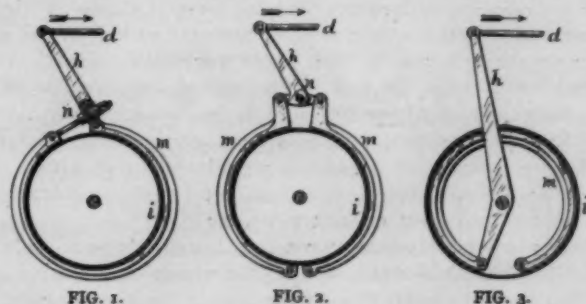
Pole-testing paper is a prepared paper which may be used for the finding of the negative and positive poles of an accumulator, says *Work*. One method of preparing it is as follows: Dissolve a teaspoonful of sodium sulphate in one-half pint of water, in which also dissolve about the same quantity of potassium iodide and of starch. To dissolve the starch the water must be heated. Soak white blotting paper in this solution, dry it, and cut into strips of any convenient size; 1-2 inch by 2 inches is suitable. Keep the paper in a dry place, such as a tin box or a glass bottle. To use, moisten a strip and place the two poles on it, nearer together or farther apart, according to the voltage of the current. A dark spot will appear at the positive pole. Another method is to dissolve 15 grains of phenol-phthalein in 1-2 ounce of common alcohol. Dissolve also 20 grains of sodium sulphate in four ounces of water. Soak blotting paper in the first solution and drain off the superfluous liquid. Then soak it in the second solution and dry it. Cut to size and use as before. A red spot appears at the negative pole.

BRAKES AND THEIR CARE AND REPAIR

By VICTOR LOUGHEED.

THERE is no part of an automobile ordinarily more neglected than the brakes. Despite their importance as a chief means of safeguarding the lives of the owner and his friends, for some reason there is a pronounced disregard of the elementary precautions necessary to insure their operative condition at all times. Cars otherwise excellently maintained often are seen with brakes in bad condition.

The reason for this slipshod attitude of so many drivers is not far to seek. Brakes are designed for two uses—one frequent but not exacting, the other of vital importance but of infrequent neces-



sity. This condition seems to inspire the average man with an inclination to gamble against the likelihood of his ever needing the brakes seriously, rather than with a disposition to depend upon their proper functioning.

The purpose of this article is to impress upon the reader the very great necessity for maintaining brakes in proper condition, while at the same time pointing out the principal essentials of such maintenance and condition. To this end it will be convenient first briefly to enumerate the more important types of brakes in common use, so that their normal condition may be at hand as an illustration of the points involved in maintenance, repair, and remodeling.

Kinds of Brakes.

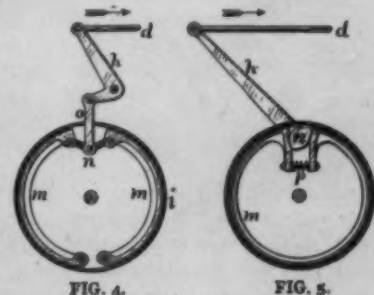
Constricting Brakes, or band brakes, are of the general type shown in Fig. 1, in which *i* is the brake drum, attached to one of the wheels, and *m* is band capable of being powerfully constricted around *i* by a pull upon the lever *h*, through means of the rod *d*. The band *m* is lined with some material which sets up a powerful friction when forced into contact with *i*. In Fig. 2 a constricting brake of slightly different type is used, the characteristic feature being the two shoes *m m*, in place of the band *m* in Fig. 1. These shoes are drawn together by the action of the toggle joint *n* when a pull on the rod *d* moves *h* in the direction of the arrow. Another type of constricting brake is that sketched in Fig. 6, in which the brake drum *i* is grooved and carries in the groove the helically coiled metal band *o*, which is held at one end by *w* and tightened by a pull on the other at *d*. Because the motion of the wheel *a* tends to wind the band tighter as it turns in the direction of the arrow, this type of brake gives an exceedingly powerful effect with a comparatively light tension, but a great objection to it is its poor holding quality when the wheel turns in the reverse of its normal rotation.

Expanding Brakes differ from constricting brakes in that the friction members are inside of the brake drum and come into action by expanding against it instead of being constricted upon it. Such a brake is shown in Fig. 3, in which the friction ring *m* is enlarged in diameter and thus forced into contact with the drum *i* when the lever *h* is moved by a pull upon the rod *h*. This brake is open to the same objection that applies to the constricting brake last mentioned, which is that it is single acting and therefore of somewhat problematical efficacy for stopping any rearward motion, especially in such a case as that of a car backing down

hill through injury to the propelling mechanism. The brake pictured in Fig. 4 is a double-acting expanding brake, so will hold against either forward or backward movement. Its principal operating members are the two shoes *m m*, spread apart by the toggle joint *n*, so it is in a manner analogous to the constricting brake shown in Fig. 2. A very satisfactory and much used type of expanding brake is illustrated in Fig. 4, in which the expanding ring *m* is applied to the drum *i* by a separation of the ends caused by the action of the cam *n*, operated by the lever *h* and the rod *d*.

Disk Brakes are less common than disk clutches, but their very obvious superiority in a number of minor respects causes their occasional application to cars of proved quality. Fig. 7 shows a disk brake of a successful form, which differs little from the ordinary disk clutch. The hub drum *i* is formed with a series of grooves in the inner surface in which a series of steel rings are held by lugs projecting from the peripheries. Alternating with the steel rings is a series of bronze rings, similar, except that in their case the lugs engage with grooves formed in the inner drum *o*, which cannot rotate, though it is free to slide endwise on the axle. The spring *p* ordinarily holds the brake disengaged, but by pulling upon the wire *d* the bell crank *d* presses both series of disks into contact, and thus exerts a powerful retarding effect on the wheel.

Sprags of various sorts are much used to safeguard automobiles on hills. A sprag, in its simplest form, is simply a sharpened rod hinged to the underbody of the vehicle, so that when dropped it points rearward and digs into the road upon any rearward movement. More recently the ratchet sprag is coming into vogue. In this form it consists of a pawl acting on a ratchet affixed to the rear wheels or in some part of the transmission, so that the car cannot back unless the reverse is engaged.



Adjustment of Brakes.

Non-Compensated Brakes are on the order of the one sketched in Fig. 8, in which *i i* are the brake drums, within which the brakes are applied by movement of the levers *h h*. These in turn are pulled by the rods *d d*, which connect with the rod *c*, rocked by the brake lever *a*. It will be noticed that *d d* are broken in the middle by

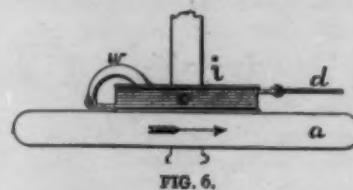


FIG. 6.

turnbuckles by which they may be lengthened or shortened, so as to produce even application of both brakes. It is very important that this adjustment be correct, since if one of the rods is too short the application of the brake with which it connects will prevent the application of the other. To get the adjustment right, it is sufficient to see that both rods are about equally tense when the brakes are lightly applied.

Compensated Brakes insure substantially equal braking on both wheels, regardless of the adjustments. A well-tried form is that shown in Fig. 9, in which the levers *h h* are both connected with *c* by a single wire cable which passes through the inside of *c* in such a manner that the tension upon it automatically keeps it shifted to an equilibrium of pull on both sides. Another compensated brake is shown in Fig. 10. In this the rods *d d* extend

only to the single tree *f*, which in turn is attached by the middle to *g*, connected with *c*. Obviously, the slight rock of *f* which will occur if *d d* are not the same length, will fully compensate the pull. The construction shown in Fig. 11 substitutes for the long

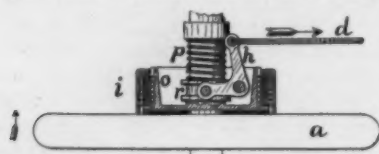


FIG. 7.

single tree of Fig. 10 a short one, at *f*, Fig. 11, which spans the two inner levers on the extra shaft *j j*. The action is similar to that of Fig. 10. It is not to be supposed that compensated brakes do not require adjustment. In common with brakes of all other types, it is exceedingly important that they be in such condition that they release freely and yet apply fully before the controlling lever or pedal reaches the limit of its movement. Many brakes violate the first of these conditions, and when they should be off, continue to drag on the drums, causing undue noise and wear. The spring *p*, Fig. 5, is a provision to insure quick release, and something of this sort is in almost every case desirable.

Friction Surface of Brakes are their most vital feature, for it is upon the quality and durability of these surfaces that the utility of a brake depends. Almost every conceivable material

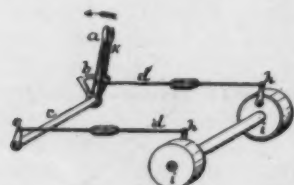


FIG. 8.

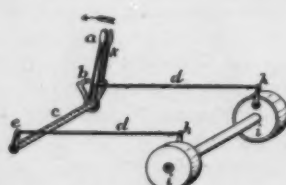


FIG. 9.

has been tried for this service, but the best results are secured only with a few. Brake drums are almost invariably made of steel, though cast iron is used to some extent. Bronze shoes work very well on steel drums and a lesser degree of success has attended the use of copper or brass blocks against steel. Bronze and steel are practically the only materials used in disk brakes. Leather forms a friction surface that applies smoothly and retards effectively, but it is less durable than vulcanized fiber or a widely-used prepared belting, known by the trade name of "camel's hair." Castiron-to-castiron or castiron-to-steel make excellent brake surfaces—much better than is commonly supposed. All brake surfaces are subject to wear and this wear is to be reckoned with rather than avoided. Its occurrence constitutes the chief necessity for occasional readjustment and regularly requires absolute replacement. Provision for such replacement is made in all good designs, and with any well-built car it is not

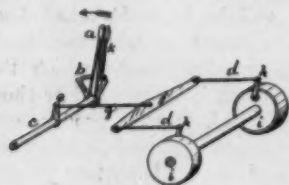


FIG. 10.

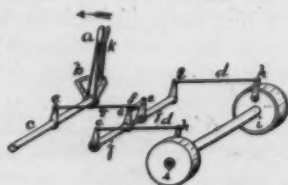


FIG. 11.

very difficult to remove the worn friction surfaces and replace them with new. Usually this will involve a readjustment of the other parts of the brakes to make the moment of application coincide with the proper position of the lever or pedal.

Overheating of Brakes is a common difficulty, especially in coasting down long hills. Some brakes are air-cooled by fans and fins cast in the hub drums; others are water-cooled by drip devices arranged to be turned on when occasion requires. It is quite impossible to secure a braking effect without the development of heat, so this phenomenon is to be reckoned with. With cars provided with more than one set of brakes, application of the two should be alternated during long coasting.

Placing and Protection of Brakes are important details. Most modern cars have several sets—at least one acting on the rear-wheel drums, one acting on the propeller shaft or counter-shaft, etc. Some of the most-approved designs have both brakes acting in separate annular parts of the rear-wheel drums, a construction that is as neat as it is effective. Internal-expanding brakes are perhaps the easiest to protect, their nature making easy a construction that excludes mud and dust. Disk brakes are similarly easy to protect. Constricting brakes usually are left to get dirty and are of such construction that a little dirt possibly improves rather than harms their quality.

Control of Brakes.

Automobile brakes control either by pedals or levers—the former being most favored for running brakes and the latter for emergencies. A forwardly-moving lever is shown in Figs. 8, 9, 10 and 11 of this article, it being arranged to lock in any position on the sector *h*, by the detent mechanism. Pedal brakes rarely are arranged to lock in the applied position, though the auxiliary latch pedal for this purpose has enough advantages to make its use a cardinal tenet with some advanced manufacturers.

Power Control of brakes is an alluring proposition, and there are several devices on the market for working brakes by compressed air, spent exhaust gases, etc.

It is a great mistake to stop a car so suddenly as to slide the wheels. A gradual retardation of the wheels' rotation not only saves tires and trouble; it actually stops a car more quickly.

Remodeling Brake Systems.

Remodeling brakes is not a difficult task for the amateur, and is excellent policy with a car the least out of date. As has been suggested herein, the changing from one type of brake to another, the provision of compensating means, the fitting of a ratchet or other sprag, the renewal of friction surfaces, the installation of a brake-cooling system, modification of the control, etc., are all or any likely to improve a car not already up to date in every particular.

INTERNAL COMBUSTION ENGINE FOR SHIPS.

Next to the steam turbine, the internal combustion engine is the most interesting feature at present in the field of marine engineering, says the annual report of the *Institution of Naval Architects*. Although no very remarkable developments have taken place since I last addressed you from this chair, the use of this type of engine for marine work in small craft of various kinds has continued to make good progress. Its popularity for pleasure boats and launches continues to spread, while for commercial purposes engines using heavy oils and running with great economy and regularity are now being turned out by a number of firms. In our submarines the gasoline engine continues to be used for surface propulsion, and one of last year's additions to our fleet of torpedo boats was an experimental one 60 feet long, built by Mr. Yarrow's firm at Poplar, and propelled by three sets of internal combustion engines, each driving its own screw. The speed of this boat was 25 1-2 knots, which was 5 1-2 knots faster than that which would have been reached had steam machinery been installed. It is not, however, to gasoline engines that we can look for the propelling machinery of vessels of any considerable tonnage, the costly nature of the fuel puts it out of the question; and, so far as we can see at present, ordinary kerosene stands only second in this category. The application of the suction gas producer to marine practice, however, affords hope of using our cheapest fuel, coal, without the intervention of the steam boiler. The elucidation of this problem is beset with difficulties, but many able minds are at work upon it; and after the start that has been made with the experimental boats, of which we heard some account last year, we may reasonably hope for further interesting developments in this field of enterprise at no distant date. Already we hear rumors of a suction producer and gas engine of power sufficient to propel a seagoing vessel of large size.

HORSEPOWER IN RELATION TO MOTOR DIMENSIONS*

By F. W. LANCHESTER.

THE foundation argument of the present paper is based on *Dimensional Theory*. It has for many years been a surprise to me how little the theory of dimensions is known, much less employed, by engineers, and if, in the present paper, I can bring it home to some few here that there is a valuable tool lying idle which is worthy of frequent employment, the time taken in the preliminary discussion of *method* will have been in no sense wasted. The past neglect of dimensional theory by the engineer seems all the more inexplicable when we remember how, in other matters, discovery and method are taken "red hot" from the physical laboratory and adapted post haste by the modern engineer to meet the insatiable demands of Western civilization.

The Theory of Dimensions.

The theory of dimensions may be said to be founded upon the very simple and obvious fact that a *time* can never be equal to a *volume* or *space*, or an *area* to a *linear* quantity, or generally one physical quantity to another involving different fundamental quantities. The question of what constitutes a *fundamental quantity* touches on the ultimate definition of our conceptions; but it is customary to recognize *three fundamental quantities*, and three only. These are: *Length, Mass and Time*, or, for short, L., M. and T., into which all other physical quantities can be resolved. The expression denoting the constitution of any derived quantity is said to give the *dimensions* of that quantity. Thus, velocity is a length divided by time and

has the dimensions $\frac{L}{T}$; acceleration is velocity generated per

unit time, or $\frac{V}{T}$, ultimately $\frac{L}{T^2}$, and so on.

It is a necessary property of all equations representing physical quantities that the *dimensions* of the two sides are in agreement. We often find an expression that apparently falsifies the above statement, but such expression or equation is always *incomplete*—there is something left to be understood, such as a physical quantity included in a constant. Thus, if I say that the acceleration produced on a motor vehicle is proportional to the force that produces it, I may write the statement in the form of an expression: $f = cF$, and where f is acceleration, F , force, etc., is a constant. Now this seems a perfectly clear statement properly expressed, but we have dimensionally:

$$\frac{L}{T^2} = \frac{ML}{T^2}$$

and the dimensions do not balance; there is an M on the right-hand side and none on the left.

Now, what does this M mean. It means that my equation is not complete. The acceleration is produced on a given motor vehicle. It is not any motor vehicle—a general expression that covers everything from an omnibus to a basket perambulator; it is a *particular* motor vehicle, and dimensional theory says: "I want to know how much that vehicle weighs." You see it does not want to know the make of the tires or the cylinder measurements. It tells us precisely what is missing to make the expression complete; it wants to know the *mass*.

An engineer should acquaint himself with the *dimensions* of the physical quantities with which he has to deal, and should make a habit of checking his equations whenever in doubt. Mistakes may easily occur owing to the employment of an *incomplete* expression in cases where the *complete* expression is neces-

sary. The method of *dimensions* will unfailingly point out a missing factor or a mistaken quantity, if such exist.

Similarity of Figure and Its Consequence.

Before proceeding to the main discussion, there is a further preliminary matter to which it is necessary to devote some attention, i.e., the question of *geometrical similarity* in bodies of varying size.

Let us take for discussion the case of a rectangular brick. We know that the volume of such a body, taking volume as a quantity we wish to investigate, may be expressed as a function of its three linear measurements, no matter what the proportions or size of the brick may be. If we know these measurements we can at once calculate the volume.

Now, owing to the simplicity of form of a brick we lose sight of an important point. We can define a brick by three measurements, but we cannot so define the volume of an irregular form. There is, however, another way of expressing the volume of a brick; we might take any one measurement, l as representing the *size* of the brick, and a co-efficient c as proper to the shape, thus:

$$\text{Volume} = l^3 \times c.$$

Then the co-efficient depends upon the *shape* of the brick, and is constant for bricks of similar geometrical form.

We thus have the volume expressed as a *function* of the *linear size* and the *geometrical shape*, and in this form the expression is applicable to any and every form of body from an Atlantic liner to a vegetable marrow. Now, so long as c is constant, that is to say, so long as we are dealing with bodies of geometrically similar form, we know, without elaborate measurement, that the surfaces of the different bodies are in the relation of their values of l^2 because they are *surfaces*, and the dimensions of surface $= l^2$; likewise, we know that the volumes are as l^3 because they are *volumes*, and the dimensions of volume $= l^3$.

Further, if the *distribution of matter* in the bodies is geometrically similar, that is to say, if the bodies are *homomorphous*, as when all are of the same density, or being of not uniform density are of like density in like parts; the masses will be in the proportion of $p \cdot l^3$ for density, (p) is of the di-

$$\text{mensions, } \frac{M}{L^3} \text{ and } \frac{M}{L^3} \times L^3 = M.$$

Thus, we know that if two machines, say motors, be built part for part alike, but differing in *scale*, their weights are as their respective *linear measurements cubed*. Now this is an ordinary everyday fact with which every engineer is acquainted, and may be looked upon as a mere matter of common sense, but, like many other matters of common sense, it is only one step removed from the abstruse.

Power as a Function of Linear Measurement.

The maximum power capacity of an engine is likewise a function of its geometrical form and its linear dimension. Taking as before geometrical form as constant, that is, assuming geometrical similarity, let us investigate *power* as a function of linear measurement, l . We know that one of the determining factors in the power developed by an engine is the revolution speed, and we must first prescribe the general conditions that determine the maximum revolutions at which an engine can be run. We know that, given adequate port areas, the limit of speed is determined as in structures of all kinds, by the *strength of materials*. We are not justified in stressing the material in one machine any higher than the similarly situated part in another; our limiting condition is therefore *stress*, $\sigma = \text{constant}$. If we assume the same materials to be used in dif-

*Paper read before The Institution of Automobile Engineers, London.

ferent machines, we have p also constant. There is no need, however, to remove these factors from the equation; we might want to employ different materials having different strengths and densities. Let us take p , σ and l as the variables on which the h.p. depends and deduce the general expression.

We have—

$$\text{H.P.} = l^p \times \rho^q \times \sigma^r \times \text{constant},$$

or dimensionally,

$$\frac{ML^3}{T^3} = L^p \times \frac{M^q}{L^q} \times \frac{M^r}{L^r T^r}$$

Whence,

$$\begin{aligned} q + r &= 1 \\ 2r &= 3 \\ p - 3q - r &= 2 \end{aligned}$$

from which we have:

$$\begin{aligned} r &= 1.5 \\ q &= .5 \\ p &= 2 \end{aligned}$$

so that the full expression is:

$$\text{H.P.} = \frac{\sigma^{1.5}}{\rho^{.5}} l^2 \times \text{constant}. \quad (1)$$

We will proceed to discuss the consequences of this result.

Deductions from H.P. Equation for Similar Engines.

In the first place, we will suppose that the same material be used in different cases for like parts; we then have ρ and σ constant, and:

(a) The power varies simply as the *square of the linear dimension*. Such linear dimension may be the *stroke* or the *cylinder diameter* or any other datum, provided the same similarly situated measurement be taken in every case.

(b) If the basis of measurement be two linear measurements (such as bore and stroke), the rating measurement may be the simple product of such measurements or the *product of their fractional powers*, provided the *sum of their indices* = 2, that is to say, so that the product shall be of the *dimensions* L^2 . Thus, if D be the diameter and S the stroke, the rating measurement might be $D \cdot S$ or $D^{1.2} \cdot S^{.8}$ or $D^{1.1} \cdot S^{.9}$, etc., or generally— $D^a \cdot S^{2-a}$. (2)

Corollary, that for engines of other than similar geometrical proportions, the same law applies, the values of the respective indices being chosen according to principles not so far investigated, for we may regard the similarly proportioned engine as a special case to which the general law must conform.

(c) That the *weight per h.p.* of similarly-designed engines varies *inversely as the linear measurement*. A most important consequence, as pointing out the essential saving of weight resulting from small units and multi-cylinder engines. Example: A four-cylinder engine, with 5" \times 5" cylinders is (fly-wheel apart) of but one-half the weight of a proportionately-designed single-cylinder engine of the same power, *i.e.*, one of 10" diameter and stroke.

(d) With certain reservations, that will be discussed later, no horsepower rating rule is defensible that does not conform to the L^2 law; that is to say, being based on linear quantities, the sum of the indices must equal 2.

Universal Character of the L^2 Law.

It is a remarkable fact that the h.p. varies, as L^2 law here deduced seems to be almost, if not quite, universal. Thus, the h.p. capacity of an animal, other things being equal, depends upon the oxygen supply, that is to say, it is proportional to the *area* of lung membrane, and in turn to the cross sectional *area* of the aorta, etc. Again, in the case of the railway locomotive, the limitations to the h.p. are, the grate *area*, the heating *surface*, the sectional *area* of the steam pipe, etc., etc. It is never a *volume*, as the *volume* of the fire-box, or the *volume* of the boiler.

At one time I was disposed to attribute this generalization to the fact that the *dimensions of power* involve L^2 thus, $\frac{M.L^3}{T^3}$;

but any such explanation is inadequate, for *energy* also involves the same linear power, and energy is always measured by the *mass*, or under certain restrictions the *volume* of the determining factor. Thus, the heat energy released by the combustion of a quantity of coal depends upon its *mass*, but the power developed is proportional to the rate of combustion, and so, other things being equal, to the total *surface* of the incandescent lumps of fuel.

It would seem probable that the considerations that apply in the case of a machine producing or transmitting mechanical energy, as herein demonstrated, where the conditions are regulated by the factors stress and density, also obtain over a much wider range of conditions, including the production or transference of energy in other forms, such as the production of heat by combustion; this aspect of the subject is outside the scope of the present paper.

To Include Changes of Geometrical Proportion.

The comparison of the power capacity of different engines, when the condition of similarity is infringed is, in reality, a highly complex problem, for the reason that we now have to deal with h.p. as a function of *geometrical form*, and the possible forms of change are multiplied infinitely. If the problem were presented in its widest mathematical sense, as supposing engines *proportioned by pure chance*, then the position might be considered hopeless. In reality, the issue is brought within very narrow limits by the assumption of a certain degree of skill on the part of the designer, and other considerations of a practical nature.

There are many factors that may independently limit the h.p. of an engine, on the principle that the strength of a chain is its weakest link. For example, a restricted port or valve area may limit the h.p. to vastly less than that legitimately due to the cylinder measurements. By common consent, it is agreed that the cylinder measurements form the most suitable basis for rating purposes. Whatever basis be chosen, we shall expect the *rating rule* to have some influence towards *distorting* the design as due to natural evolution; for instance, if we were to take the valve or port area as basis, the designer would be tempted to cut this down as much as possible, and a highly undesirable kind of *distortion* would come into vogue, resulting in great loss of efficiency. In choosing the cylinder measurements the tendency is in the opposite direction; *i.e.*, the ports are made as free as possible, which, inasmuch as it tends to efficiency, may be looked upon as a fault on the right side. It must be understood that there is no *strictly scientific* reason why the cylinder measurements alone should be taken as the basis, it is a matter of convenience or common sense; the tacit assumption is made that the other determining factors are so dealt with that their effect is negligible,—it is for the designer to see that this tacit assumption is complied with.

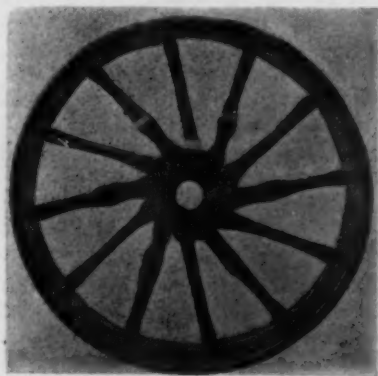
Having determined on cylinder measurement as a basis, it remains for us to investigate the conditions controlling the index values in the expression $D^a \times S^{2-a}$, so that the designer, under the rating rule, cannot gain by adopting extreme proportions; that is to say, so that the rule adopted will not result in any distortion of the design in respect of the proportions of stroke to diameter.

(To be continued.)

The action of oils on vulcanized rubber is a subject which is much misunderstood generally. Thomson did some splendid work on the subject some years ago, but since then no great progress has been made. He found that rubber threads treated with a small quantity of oil preserved all their properties. With a larger quantity oxidation set in very quickly. Coconut and palm oil acted the most energetically; castor oil had the least action, and is one of the few not harmful to rubber.

WHAT AUTO INVENTORS ARE DOING ABROAD

IN the construction of ordinary wooden artillery wheels the spokes are placed, as is well known, radially to the hub, where they are in a position which has hitherto been considered the best if not the only possible one for them to occupy under the circumstances, says the *Automotor Journal*. The spokes of wooden wheels are, of course, in compression, in which respect they differ from those of the wire wheel, which are in tension,



TANGENT SPOKE AUTO WHEEL.

and which are in consequence arranged tangentially to the hub. To place wooden spokes tangentially to the hub, therefore, is essentially a radical departure in wooden wheel construction, but it would appear from the success which has so far met the production of the tangent wheel shown in the accompanying illustration, that there is a good deal to be said for this method of arrangement. On the wheels made by this firm the spokes have wedge ends, instead of being turned down into tangs, and at the hub these wedges lie close up against one another to form a solid boss similar to that of the ordinary artillery wheel, except that the center lines of the spokes are tangential instead of radial. At their outer ends the spokes are wedged into the felloe so that they obtain a bearing surface across their full width. Among the features claimed for this principle of construction are that it gives greater resiliency and longer life to the wheel. The increased resiliency is attributed to the spokes bending slightly under sudden shocks, while longer life is claimed to result partly from the increased resiliency and partly from the reduced effect which shrinkage in the spokes has on the wheel as a whole.

Some Detailed Refinements of the Adler.

In addition to displaying that painstaking thoroughness that is characteristic of the Teuton, the German automobile builder has also demonstrated that he is not behind his confrères of any other nation in devising those refinements of detail that add to the convenience and safety of the car in operation. The Adler, which was prominently staged at the recent London show, affords an excellent example of this. As an instance, there may be cited the use of a toe pedal for admitting fresh water to the cooling jackets of the brake drums, this pedal being part of the regular

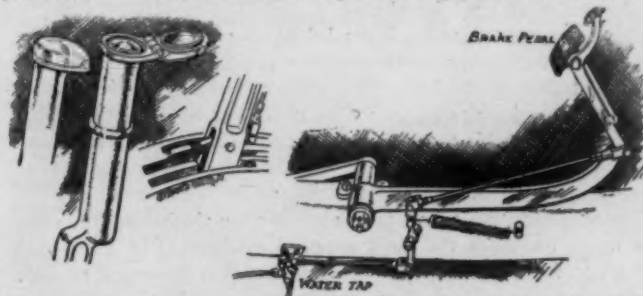


FIG. 1.—Concealed reverse trigger.

FIG. 2.—Toe pedal to admit water to brake drum.

NEW DETAIL FEATURES OF THE ADLER CAR.

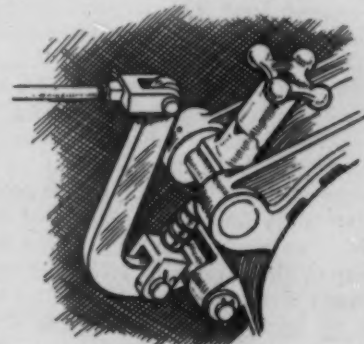
brake pedal, and may be brought into action together with the latter or not, as desired, a slight change in the angle at which the foot is held in braking being all that is required. The con-

nections of the device are clearly illustrated in the accompanying sketch from *Motor* (London), to which we are also indebted for those of the Adler concealed reverse trigger and the Nacke hand adjuster for pedal brakes. As will be plain, the water cock of the oscillating type is attached to the frame directly behind and in line with the brake pedal.

The illustrations of the concealed reverse trigger are practically self-explanatory. Under ordinary running conditions, a cap covers the reverse trigger, so that it is impossible for it to be inadvertently depressed. This cap is sufficiently close-fitting not to be disturbed by the jolting or vibration of the car, but readily yields to the fingers. When thrown back, the trigger may readily be depressed the same as though no safeguard were provided. The device represents an added touch of refinement to the various methods of preventing the accidental use of the reverse gear ordinarily employed on the majority of cars.

A Very Convenient Method of Brake Adjusting.

It must be admitted even by the designer himself that there is yet considerable room for improvement in the way of facilitating means of adjusting a number of the essential parts of the average car. Naturally the millennium is represented by a car on which most of the adjustments could be made by hand, and at most the only tools needed would be a single wrench, a screw driver and a pair of pliers. That there is a more or less pronounced trend in this direction is quite evident from the number of devices brought out from time to time with this end in view. One of them that has attracted a deserved amount of attention is the Nacke hand adjuster for drum brakes of the type universally used on cars. This first made its appearance about a year ago, and has been adopted on some of the Italian cars. As the surfaces of the brake bands wear it is possible to make them snug again merely by a quarter turn of the handwheel, which automatically locks at each quarter turn unless held out of engagement by the notches shown; a helical spring maintains the adjustment wherever set.



NACKE PEDAL BRAKE ADJUSTER.

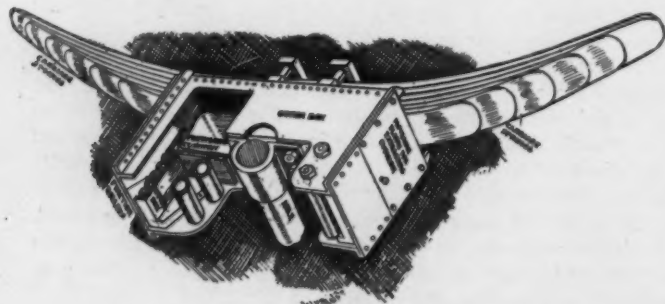
A Novel Type of Shock Absorber.

The Simplex Shock-Absorber is devised to be interposed between the axle and the carriage spring, a set of four on each car thus absorbing the first portion of the shock from the road, says *Motor* (London). The device is shown in elevation and part section in the diagram. It will be seen to consist of an external box, which carries the carriage spring. Attached to the axle is the interior box, and between the two is the pneumatic cushion which acts as the absorber. The two boxes have extensions between which are steel friction rollers (lubricated with dry graphite) for the purpose of guides. When the cushion is inflated to a pressure of about 10 pounds to the square inch it will carry a load of 500 pounds. If the load per wheel is heavier than this the pressure may be slightly increased or an absorber of slightly larger dimensions can be employed. The pressure can easily be regulated to suit the character of a district. Should the cushion deflate (the likelihood of which is small), the outer box settles down on the axle and the position is thus as if the spring were rigidly bolted to the axle. One of the ends has a plate which is readily removable for the purpose of replacing a cushion.

The device is well worthy of careful inspection. It is shown complete, dismantled, and also fitted on a car on which it has been tested over a considerable distance.

Differential Locks Used on Steam Trucks.

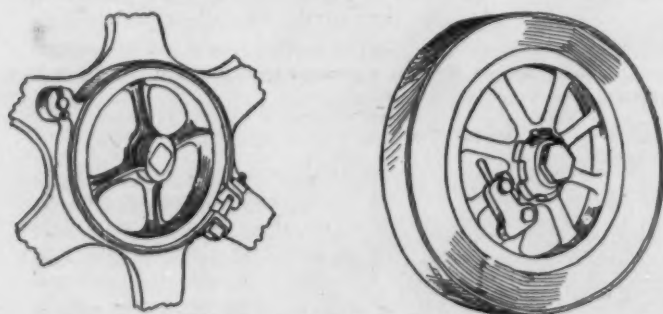
The commercial section of the Agricultural Hall show recently held in London brought forth a representative showing of what would be called traction engines in this country, but which the



A NOVEL FORM OF ENGLISH SHOCK-ABSORBER.

Englishman dubs a "lorry." Like our road rollers and plow-pullers, by far the greater number of these lorries are driven by steam and always have been. In fact, they are an ancient and well-established institution in England for heavy haulage, having existed prior to that abortive piece of legislation that barred the public roads to anything that moved under its own power, unless it went on legs. This accounts for the large number, as well as the wide diversity in which these vehicles were exhibited.

One of their features that is bound to catch the eye of the automobile sharp is the provision for locking the differential that is made on some, if not all of them. Just why the differential should be put out of action does not appear at first sight, but it is evident that the needs of a slow-going two to five-ton truck, or a tractor that may be pulling two or three times this weight behind it, are quite different from those of the swift-traveling automobile. The employment of a means for locking the differential gives all the advantages of a rigid driving axle when traveling straight ahead, and the driver always has plenty of time to operate the release gear before taking a turn. Two forms of the method employed for effecting this end are shown by the accompanying sketches. One, shown on the complete wheel, is termed the "Sentinel" differential lock, and consists of a pawl and toothed wheel, while the other, known as the "Mann," partakes



TYPES OF DIFFERENTIAL LOCKS USED ON ENGLISH LORRIES.

of the nature of a brake band, and is probably operated from the seat of the lorry by similar means—i.e., a small hand lever or pedal. In the case of the former, the pawl is fastened to the wheel and the toothed or starwheel to the rear axle, so that the device as a whole constitutes the simplest form of differential possible. For rounding a curve the pawl is pulled out of engagement, permitting its driving wheel to run free of the axle, all the power being transmitted through the other wheel, which is rigidly fastened to the axle. This gives a positive drive when in action, which would not appear to be the case with the Mann with its drum and brake band.

THE GASOLINE FAMINE.*

By L. BAUDRY de SAUNIER.

It appears that we are in danger of dying of hunger in the person of our motors. The liquid food which, vaporized and mixed with air, gives them force, is getting scarce. Week by week the rates for modern oats are rising. The reason is simple: automobiles are already too numerous. As the production of gasoline is necessarily limited, there is an eager demand for the barrels, and rates rise. A day will come when the countries producing gasoline will keep it all for themselves and we shall have no need to show eagerness.

But why is the production of gasoline necessarily limited? It is because gasoline is distilled from petrol, when the petrol contains any, for all petrols do not contain the precious liquid. Russian petrols contain next to nothing; American mineral oils give about 10 per cent; Indian petrol about the same, and Roumanian petrols contain 20 per cent. of gasoline. That is all there is.

The producer says, "You will evidently take all the gasoline I can produce, but will you also take the kerosene, the heavy oils, the greases, etc., all products of the distillation of petrol in company with gasoline, and which are produced in much greater quantity than gasoline itself? What shall I do with these? You do not ask for them at all in the same proportion as the gasoline."

In this state of affairs we turn towards alcohol, the alcohol which is to be found in our beetroots and our potatoes. I believe that in a not very distant future our internal combustion motors will be fed on alcohol. Examples of its application for our purposes are already encouraging. But we must not forget that they are only encouraging, and that everything has yet to be done to make alcohol as practical for us as is gasoline.

But is alcohol any cheaper than gasoline? No; per gallon it costs a trifle less, but we consume more. Pour it into the tank. What is this? A few drops have fallen on the paint and as many holes have been formed. Yes, alcohol dissolves paint. This is a grave defect that workshop experiments do not reveal, but which good solid practice brings to light instantly. We look glum.

Try to crank your engine. Not a bit of it. No more explosions than in a coffee mill. The motor must be warmed before it will run on alcohol. In other words, we must start with gasoline. We are off, but what a smell. It is the benzine that is burning, the benzine mixed with the alcohol to form a carburant.

We stop and examine the motor. The valves are red; the valve seats and the combustion chambers are red. A few hours of this and our engine will be paralyzed. Sorel, one of our best chemists, and one who has most closely studied this question, says that the fault is with the methylated spirits with which the authorities poison our alcohol in order that we may not drink it. As soon as the combustion is imperfect alcohol with methylated spirits is transformed into formic aldehyde or "trioxymethylene." And that is why our alcohol motor remains silent. Combustion is imperfect the moment gasification is not absolute. A carbureter which is satisfied to pulverize the liquid as our present carbureters do is deplorable when used for alcohol.

Before crying "Gasoline is dead, long live alcohol," it would be well to ask the one most interested, the engine of your automobile, what he thinks of it. Prove to a horse by most scientific calculations that wood shavings are the most modern food for the equine race, the fashionable food which ought to be in every hayrack, and he will die nevertheless, unless you know how to prepare your shavings so that they can be assimilated by his stomach.

There is certainly a brilliant future for the alcohol motor, since the liquid possesses the most precious qualities. But we should not try to foolishly convince ourselves that it is at present suitable for our motors. Everything has to be created: the carbureter which will carburete perfectly, an ignition which will fire the charge punctually, the motor itself which will use the entire practical portion of the explosion. Until that is arrived at we shall have a series of interesting experiments and a re-edition of races and industrial tests such as we have had for the last ten years.

*Translated from "Omnia" by W. F. Bradley.

LETTERS INTERESTING AND INSTRUCTIVE

Kerosene and Alcohol as Emergency Fuels.

Editor THE AUTOMOBILE:

[726.]—It being a matter of interest to me, and doubtless to others, I will be glad to have your advice as to the use of kerosene oil and alcohol in gasoline motors. Say, for instance, a party is on a trip and gasoline runs out from accident or oversight. Kerosene or alcohol can be secured almost anywhere, and I would like to know just how and what use can be made of each and how best to use them. It is a Cadillac single-cylinder 1906 Model M I am using.

ENQUIRER.

Rowland, N. C.

In an emergency such as you mention, either alcohol or kerosene may be used as fuel without any great difficulty and without making any alteration to the engine. This will be the case particularly if the engine happens to be running when the shortage of fuel is discovered, as it will then be hot, and may be started on the new fuel without any great trouble, or, better still, may be kept running merely by pouring the new supply into the tank. If the engine has stopped and cooled off, there will be more or less difficulty experienced in getting it under way again on either alcohol or kerosene, but once started it should be easy to get home. As both of these fuels require considerably more heat to properly vaporize them than gasoline does, the operation of the motor will be greatly improved when using them by conducting as much hot air from the exhaust as possible round the carbureter, beside using hot air for the mixture.

In case the engine has cooled off and will not start on the new fuel, the best method of facilitating this is to procure some hot water. Take some old rags or waste, soak them in the water, and swathe the carbureter with them in order to raise its temperature as much as possible. The rags will be preferable owing to the danger of getting lint into the carbureter when using waste. Vigorous turning of the crank will assist the vaporization. If a down-grade be handy, let the car roll down it, and when some momentum is attained ease in the clutch gently on the high gear. Owing to the greater suction exerted on the carbureter by the engine under such circumstances, this is an expedient that seldom fails to start it, other things being in order. Failing the convenient hill, a few husky men or a horse to get the car rolling will suffice. Never use anything but the high gear or direct drive and ease it into engagement very gently; throwing in the low gear will bring the car to a sudden stop on the level, or impose a terrific strain on the transmission if the car happens to be coasting.

Why One Cylinder Fired Louder than the Others.

Editor THE AUTOMOBILE:

[727.]—In response to request contained in letter No. 698: The trouble which caused the louder exhaust in one of the four cylinders of my engine was in the hammer vibrator spring, which I conclude was too stiff to admit of its being perfectly adjusted, and I think on this account only fired part of the charge in that cylinder. I had previously put in a new contact spring which did not remedy the trouble, but upon putting in a new hammer spring the trouble was immediately overcome and each exhaust from the four cylinders is now perfectly equal in sound again.

Westfield, Mass.

LELAND M. GILMAN.

While the lag in one of the coil vibrators may have been responsible for the uneven firing of one of the cylinders of the four-cylinder engine in question, your conclusion that the greater amount of noise developed arose from the fact that only part of the charge was fired would hardly appear to be correct. If less than the normal charge were being fired by that particular cylinder there is good reason to believe that the sound would have been less rather than greater than that of the other cylinders. What was probably the case, in view of the fact that the change to another vibrator cured the trouble, was that the lag delayed the explosion enough to destroy the sequence and the late one was emphasized by occurring slightly out of time.

Concerning the Worm Gear Type of Drive.

Editor THE AUTOMOBILE:

[728.]—I note in the April 4 issue of "The Automobile" an illustration of a Franklin truck Type J, with a worm and gear drive. Can you give me any additional information regarding other users of the worm and gear drive, also reference to any tests of well-designed worms and gears? Any information you may be able to give me on this subject will be appreciated. I find your publication of great value as well as interest.

F. M. COCKRELL, JR.

Warrensburg, Mo.

Beside the Franklin truck you mention, the Mitchell commercial vehicles also employ the worm gear type of drive and have done so for more than a year past with considerable success. We do not know of any other automobile builders in this country at present using this type of drive, but understand that several are at present experimenting with a view to its adoption. Abroad, the Dennis 'buses have used it for two years or more, very successfully, we believe. The efficiency of the worm and gear drive is relatively low, and, unless properly designed and well made, very low, so much so in fact as to preclude its use. The amount of loss through friction naturally varies with the pitch as well as the velocity at the pitch line. With the latter at 100 feet per minute, a worm of 10 degrees pitch gives an efficiency of 82 per cent. as compared with 98 per cent. for spur pinions and .955 per cent. for 45 degree spiral pinions. Increasing the velocity to 200 feet per minute with the same pitch as mentioned, gives an efficiency of 86 per cent.; with worms of 5 and 7 degrees, respectively, the efficiencies are .765 and .815 per cent. respectively at the same speed. The tests from which these data were obtained were made on ordinary machinery at low velocities, and consequently have little if any bearing on the use of this type of gearing on the automobile. Marsh, Williams & Co., Philadelphia, Pa., are makers of this class of gears and will doubtless give you any detailed information you wish.

Poorly Aligned Gear Shafts Cause Binding.

Editor THE AUTOMOBILE:

[729.]—Will you kindly publish in "The Automobile" a remedy for the following? I have a two-cylinder Clement-Bayard—a grand car in all ways, with the exception of the great rattle in the transmission gear case from the gears. It has three forward speeds, and sometimes when traveling on the direct drive or high-speed, I have a hard time to shift gears in order to stop. I have to exert all my strength against the shifting lever to get the gears out of mesh. The jack shaft is directly over the other shaft. Should the teeth of every gear be on a direct line with the others, so as to make a straight line? Also, could I use fiber gears? Could I use a little air pressure on my common gasoline tank, which is a trifle lower than the carbureter?

Hoping to see these questions answered in "The Automobile," which I read regularly.

C. W. BYE.

Corona, L. I.

It seems evident that one or the other of the shafts in the gear box has been sprung out of line, in all probability the jackshaft, or it may be that both have got out of line, which would account for the binding, as you mention disengaging calls for considerable strength. The teeth of all the pinions should be in an absolutely direct line, so that they will coincide when brought together, and when in this condition there is no difficulty in either engaging or disengaging the gears. Doubtless you will find that both the pinions themselves and the bearings of the shaft have become worn, the latter particularly being responsible for a great amount of chattering and rattling, as it permits the entire shaft to jump and bounce, according to the amount of play there happens to be. If the bearings are snug and the gears accurately aligned, we see no reason why the gearbox should make an unusual amount of noise, especially if the gears are kept properly lubricated. Fiber gears would never stand such service as the pinions in a change-speed gearbox are called upon to perform; they would go to pieces in a very short time. If the pinions in the car at the pres-

ent time are very badly worn, it will be necessary to replace them to make the car silent-running. Should the objectionable noise still continue after making the necessary repairs and replacements, as above suggested, we think the expedient commonly resorted to on electric street cars might be adopted to advantage. This consists of filling the gear boxes with a mixture of grease or heavy lubricating oil and sawdust. In your case it would be preferable to use jewelers' sawdust, which is very fine. This has been used with good success on old cars afflicted with trouble similar to yours, but it is a poor remedy at best to muffle the clattering made by a worn and badly aligned set of gears—correct these evils first and see if the one you complain of does not disappear with them before adopting this.

There is no reason why you cannot use air pressure on the tank now fitted on the car. Of course, it will be necessary to fill the air vent in the present stopper.

Annular Bearings for Thrust.

Editor THE AUTOMOBILE:

[730.]—In an ordinary annular ball bearing, of the Hess-Bright non-adjustable type, a suitable bearing to sustain thrusts? I have noticed numerous applications of this bearing to this character of service, but I cannot understand why it is well to use it so, when it is remembered that the same concern makes an excellent type of thrust bearing, especially adapted to its purpose.

Rochester, N. Y.

GEORGE A. ELLIS.

Annular ball bearings make excellent thrust bearings, and are perhaps rather easier to find space for in a given design than the more highly specialized thrust bearings. The fact that thus used they will take either thrust or lateral stresses is a point in their favor. Used for thrust it is customary to leave them free in a plane at right angles to the axis of the shaft, but to confine them closely in the other direction. Just the opposite applies to the same type of bearing used in the ordinary manner. It is well to bear in mind that when an annular ball bearing is used for thrusts, all, instead of one or two, of the balls are dividing the load, whereas with the same bearing under other conditions one or two balls must be capable of carrying the whole load.

Advisability of Solid Tires on Steam Runabout.

Editor THE AUTOMOBILE:

[731.]—I would like to know if it would be advisable to employ hard (solid) tires on a Stanley steam runabout. What other solid tire is made in the shape of a T, or along those lines, beside the Swinehart? Any information you or your readers can give me on this subject will be appreciated.

Newton Center, Mass.

C. C. BUTTS.

There is no reason why you should not be able to use solid tires on your car, particularly if the roads in your section are good, but it will be to greater or less extent sacrificing your comfort, as there is bound to be more vibration and more jolting felt with the hard tires than with the pneumatics. Your car is so light and easy running that we should hardly think the change worth while, and certainly would not recommend it. If you will equip your car with a good double-tube pneumatic tire of the proper size to carry its weight, you should have little or no trouble from this source. You will find the various makes of solid tires announced in our advertising columns.

Some Queries Concerning Compression.

Editor THE AUTOMOBILE:

[732.]—I would be obliged if you could give me in your valued paper some information re correct compression in cylinders. What would be good compression for a four-cylinder, 15-horsepower car having cylinders of 3.1-2-inch bore by 4.1-2-inch stroke? Also, has a car with larger cylinders greater compression? Of course, I understand the nearer the head of a cylinder the piston goes the greater the compression, but I take it automobile manufacturers all design engines so that pistons rise as high as possible in cylinders—so that need not be taken into consideration.

Toronto, Can.

P. C. LARKIN.

The correct compression in any motor cylinder would naturally be that for which it was designed, so what would be the correct compression for one would not be the same for any other except

of the same design, size and make. Sixty to seventy pounds to the square inch would be a good compression for a motor of the dimensions you mention to have an output of 15 horsepower at a speed of 1,200 to 1,500 r.p.m. or over. An increase in the size of the cylinders does not necessarily mean a corresponding increase in the compression. While the power for the same size increases with greater compression, there is not only a point where the benefit to be derived would be neutralized by the greater amount of power absorbed in overcoming it on the compression stroke, but also a point where it is no longer safe to carry the compression any further, owing to the danger of spontaneous ignition; with gasoline this is about 100 pounds to the square inch.

Automobile engines are not designed so that the piston rises as high as possible in the cylinder, nor for that matter are any internal combustion engines. A space known as the clearance is always allowed for, and the depth of this in connection with the design of the cylinder, valve pockets and the like governs the compression. This clearance or combustion chamber is usually calculated with reference to the length of the stroke, and ranges from about 20 to 35 per cent. of the latter, these figures probably representing the extremes in either direction. This part of the cylinder is generally counterbored to a slightly greater diameter.

Instruction Books Wanted by General Repairers.

Editor THE AUTOMOBILE:

[733.]—As there are a number of factories that make a business of repairing automobiles in addition to their regular work without having the agency for any particular car, we would like to ask if "The Automobile" does not think it advisable for the makers to furnish such repairers with their instruction books, as it would be a great help. We have more or less auto repairing to do here owing to the great number of break-downs caused by the state of the roads between Utica and Albany and we have come across cases where it has been necessary for touring parties to call the makers on the long distance telephone to find the correct setting of the valves, thus occasioning extra expense as well as delay.

We hope "The Automobile" will keep the execrable condition of the roads in this part of the State before the people; they could not possibly be worse and are a positive disgrace to civilization.

Fort Plain, N. Y.

ALPHONSO WALRATH CO.

We have no doubt that the makers of any particular car will gladly send copies of their instruction books to you upon application; by noting the particular cars most frequently met with in your part of the State and obtaining the instruction book of each you will have a library that should be of considerable assistance in making adjustments.

DARRACQ RACERS AND THE DIFFERENTIAL.

Editor THE AUTOMOBILE:

[734.]—We notice an article in your issue of April 23, being an answer to letter No. 722, written to David F. Ladin, regarding the racing cars constructed without differentials. The statement that the car with which Wagner won the Vanderbilt Cup race was constructed without a differential is a mistake. The car with which Hemery won the 1906 Vanderbilt Cup race was made without a differential, and likewise the 200-horsepower eight-cylinder car with which Demogeot made two miles in :58 4-5 on the Ormond-Daytona Beach, January, 1906.

The 1906 racing cars which the Darracq company built, one of which Wagner drove to victory in the Vanderbilt Cup race, were all supplied with differentials. The 1907 cars being built for the Grand Prix race are minus the differentials.

DARRACQ MOTOR CAR COMPANY,

New York City.

G. M. MacWilliam, President.

PROPER SIZE OF TUBING FOR FLASH GENERATOR.

Editor THE AUTOMOBILE:

[735.]—I would like to hear from a number of steam users as to what size and weight of tubing has been found most serviceable, all things considered, in flash and semi-flash boiler practice. I think, from experiments last fall, that a moderately large tube is not a bad idea, since it gives the safety from leakage afforded by the water tube method and also more elasticity of control, as there is a considerable reserve, combining the best points of the water tube system with those which make the fire tube system desirable.

Decatur, Ill.

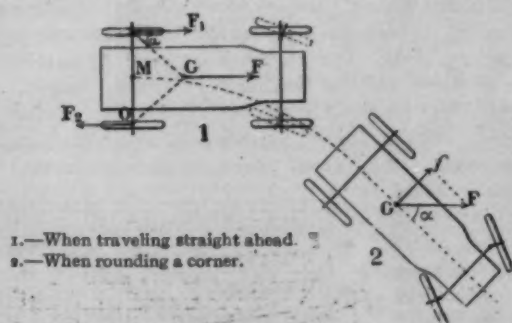
GEORGE A. HENDERSON.

EFFECT OF THE DIFFERENTIAL ON SKIDDING

By PAUL BARY, in *L'AUTOMOBILE*.*

NOT long since there appeared in our columns an article criticising the use of the differential on automobiles on the ground that it facilitated skidding and side-slipping. There is an opinion in Germany, disputed, it is true, but also admitted at times, that the differential does appear in this pernicious rôle. In the present article there is set forth an opinion directly opposed to the foregoing, and which is quite convincing; we think, however, that the divergence of views is such that it is necessary for every one to form his own opinion from his personal experiences, as each of the latter occurs under special circumstances and in which observations may be rapidly made as all the circumstances are known. On the other hand, the observation in question is neither methodical nor systematic because the autoist has taken no pains to make it so, and in consequence the conclusions that may be drawn from it are of little or no value.

If it were possible to make a comparison between two touring cars the same in every respect, with the exception of the rear axle, which on one would be equipped with a regulation differential, and on the other with a friction or ratchet device permitting



1.—When traveling straight ahead. 2.—When rounding a corner.

DIAGRAM ILLUSTRATING THE FORCES INVOLVED.

the wheels to run at different speeds in rounding turns, the alternate use of these two vehicles on the same curves would constitute a basis on which to find for or against the differential. Unfortunately such a comparison has never been made so far as is known with gasoline vehicles; electric cars, whether with one or two motors on the rear axle, are hardly to be considered, as there is not sufficient difference between them where skidding is concerned. Nor do they run at sufficiently high speeds to make accidents from this cause at all frequent.

In consequence, it is necessary, in order to form an opinion in the matter, to discuss the causes that lead a vehicle to slide laterally in the line of the rear axle, and to ascertain if these causes are due to the differential or to some other part of the car. We will accordingly consider the car shown diagrammatically in the accompanying sketch, and will assume that the position 1 shows the car progressing at a certain speed and with all four wheels accurately in line; the driver then applies the brake suddenly. The moving mass of the car M with its center of gravity at G tends to continue in the same direction that it has been running, as indicated by the arrow F . Whichever brake be applied, and whether it results in the blocking of both rear wheels, or only one, or whether it be the pedal brake, nothing can change the direction of the force F tending to cause the car to continue along the same line. It is, in fact, evident that one wheel continuing to turn, whether on account of the lesser amount of traction, or on account of its brake band being much looser, the force continues to act in the line of F , since the force F_1 of that wheel is parallel to F and the angle w is unalterable.

What happens in actual practice, however, is that the vehicle is not always in a mathematically straight line, and the force F acts as a couple by reason of the immovable wheel O and the

product of the reaction in the direction which the driver is powerless to maintain completely. Hence the vehicle assumes the position indicated by 2, and the component of the slipping force $f = \frac{F}{\alpha}$ may attain considerable value.

The true cause of the side-slipping is to be found in the fact that the direction of the vehicle is influenced by this lateral force, and the steering gear is never completely free from this stress, nor is it completely irreversible; any one of these conditions completely fulfilled proves an ample preventive of skidding in a straight line. It is easy to recall experiences where, in operating the brake on one rear wheel, a strong tendency for the car to turn is felt, and if this comes as a surprise to the driver, as where the brakes are applied suddenly, it is impossible to recover in sufficient time to prevent it, and the vehicle slews right round.

We are reluctant to believe that the case cited in the former article referred to, that placing one wheel on good ground and the other on a slippery surface, is particularly conducive to side-slipping, since it may be said that this is really a condition chosen by so many automobilists, who place but one non-skid tire on the rear wheels, and who by that precaution are protected in the majority of instances from those ill-effects of side-slipping that result from the use of smooth tires. (This was a more or less general practice in Paris a year or two ago.)

It is true that up to the present we have not considered that special rôle of the differential which is illustrated where, with the cardan shaft held, one of the wheels is turned by hand, and the other immediately begins to turn in the opposite direction, the same action taking place in service where, with one of the wheels equipped with a non-skid tire, it continues to turn forward in the direction of the travel when the other is compelled to rotate in the opposite direction.

Again referring to the illustration, let us assume that one of the wheels is held at O and the axle is subjected to a force F_2 in a direction counter to that of F_1 . These two forces will produce a couple tending to cause the vehicle to turn about the center of the rear axle M , a movement that cannot be produced in traveling except by lateral slipping of the forward part of the car. This slipping not occurring, the simultaneous action of the two rear wheels turning in opposite directions will be without any direct effect; it will operate, however, as we have already mentioned above, in the direction of the forward wheels.

On the whole, we think the possibility of eliminating the differential forms an interesting subject for study, and its successful culmination would constitute marked progress, just as the abolition of such a relatively delicate piece of mechanism would from any machine, but unfortunately it would not result in the prevention of side-slipping and sudden slewing round, which with the present long vehicles can only be avoided with good non-skid bands and well-fixed steering gear.

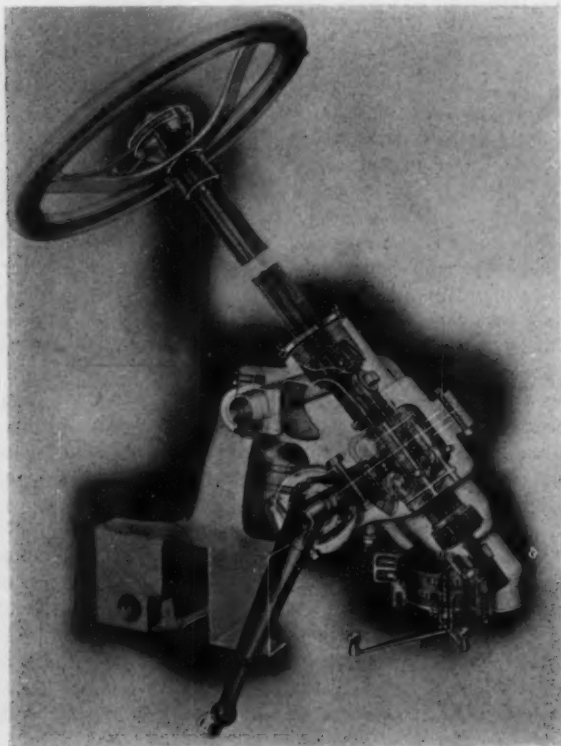
TOTAL ANNUAL CONSUMPTION OF ALUMINUM.

One of the striking results of the great progress of the automobile industry has been the tremendous development of the manufacture of aluminum, of which some idea may be had merely by quoting a few figures. In France, no less than 35,000 horsepower are continually employed in the making of aluminum; Germany utilizes some 21,000 for the same purpose, the United States a like amount, and Scotland about 6,000 horsepower. This represents something like 82,000 horsepower in round numbers—an amount that can easily be doubled in the works now in existence. As each horsepower represents an annual output of 200 kilos of aluminum, it means that the total yearly production is something like 16,500 tons, of which 12,300 are produced in Great Britain and on the Continent of Europe.

*Translation by Charles B. Hayward.

STEERING GEAR WITH DISTINCTIVE FEATURES.

That a great deal of study has been devoted to the evolution of a form of steering gear designed along lines radically differing from those followed in current practice, in the making of the Marmon steering gear, will be evident at a glance at the accompanying illustration of it. A model of it with the aluminum housing cut away to show the interior was on exhibition at last



MARMON ADJUSTABLE ROLLER-BEARING STEERING GEAR.

winter's shows and received considerable favorable attention, particularly at the hands of designers and builders of cars. The casing is of cast aluminum and is made oil and dust-tight; it is filled with oil or thin grease so that all parts are thoroughly lubricated. The steering column is mounted on Timken roller bearings, one at the bottom of the aluminum case and the other at the top, thus supporting the screw and nut mechanism of the gear centrally between them. These bearings are adjustable by means of a single nut on top of the case. The steering arm, which is a one-piece drop forging, is also mounted on the same type of bearings and is adjustable in the same manner, the single nut being conveniently placed at one end.

The column carries a steel screw working in a large bronze nut having a lining of hard babbitt. Bronze pins, forming part of and extending on each side of the nut, carry slotted steel links, the lower ends of which are pin connected to the two arms of the yoke forging which is keyed to the steering arm. A wing segment in the center of the yoke forging works in a slot in the bronze nut, preventing the nut from turning and likewise relieving the links from twisting. Two set screws in the casing act as adjusting stops on the wing segment, thus regulating the extreme movement of the steering arm. With this arrangement the mechanism is held in perfect alignment.

This form of construction lends itself particularly well to the elimination of lost motion between the parts and only neglect in providing oil or very long continued use should bring it about, in which event the babbitted nut can be readily replaced with a new one at small expense. Though irreversible, the lever connections are so well proportioned with the size and pitch of the screw that the steering is very easy, giving that much desired "feel" of the road which is a characteristic of only a perfectly

balanced and easy working gear. The column has a stationary brass tube casing through which the rods of the spark and throttle control extend, being connected to two pin ratchet segments at the bottom of the case. A foot accelerator is employed to operate the throttle independently of the position of the lever over the wheel. The steering wheel itself is built up of black walnut segments on a solid three arm wheel casting, and is given a high polish in the natural finish of the wood. As shown, the entire column is mounted on a single tubular cross member somewhat after the fashion of a trunnion, permitting the slant of the column to be adjusted to suit the driver. Oil injected under the cap on the wheel lubricates all the moving parts of the column. The Nordyke & Marmon Company, Indianapolis, Ind., will make this gear a standard part of the equipment of their Marmon cars from now on.

SOME TESTS OF LUBRICATING OILS.

The diagrams herewith submitted show the results of a number of tests of lubricating oils, made by me some time ago, says A. L. Westcott in *The American Machinist*. The machine upon which these tests were made consisted of a shaft running in bearings on a machine frame, and carrying on one end a journal, running in a bearing the two halves of which were pressed together by a heavy spring. A lever arm, bolted to the bearing, was supported in a horizontal position at its outer end, on a platform weighing scale. The springs were carefully calibrated, so that the pressure on the bearing was exactly known. A suitable opening was provided in the bearing for the insertion of a thermometer. Oil was applied by means of an ordinary sight-feed oil cup, at the rate of about twelve drops per minute.

The journal was of steel, 3 1/4 inches in diameter and 8 inches long, and the bearing was of cast iron. The speed, in tests Nos. 1, 2 and 3, was 410 revolutions per minute; in Nos. 4 and 5, 500 revolutions per minute, giving surface velocities of 350 and 425

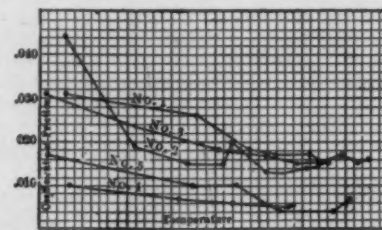


CHART OF LUBRICATING OIL TESTS.

feet per minute, respectively. The load on journal in all tests was 1,400 pounds, or 54 pounds per square inch of projected area.

The tests were about two hours in length, observations being taken of temperature and scales load every fifteen minutes.

The curves show, in general, a decreasing coefficient of friction with increasing temperature, up to 150 degrees; and the conclusion may be drawn that with the oils tested that temperature may be safely attained in practice without danger of seizing.

The sudden rise in curve No. 2, at 122 degrees, was caused by the accidental stopping of the machine at that point. It was immediately started again, and the next observation showed an increase from 0.015 to 0.020; but the following observation dropped back to 0.013. This indicates that, on starting, it takes some time for the film of oil between the bearing surfaces to become reestablished.

USEFUL FLUX FOR WELDING STEEL AND IRON.

The following flux is recommended by French engineers for welding steel and iron or steel to steel, says *The English Mechanic*: Borax ten parts, salammoniac one part, prussiate of potash one part, iron filings free from oxide or rust about one-third of a part. The mixture should be reduced to powder in a mortar. Water is added until the mixture becomes a heavy mush. It is placed on a wood fire and stirred. A material of about the appearance of pumicestone is thus produced. It is then pulverized to fine dust and is ready for use. The flux is sprinkled over the metals to be welded when they are at the welding heat.

SOME SUGGESTIONS REGARDING LEGISLATION

WALTER S. SCHUTZ and Stanley W. Edwards are the attorneys for the Automobile Club of Hartford, and in a pamphlet recently prepared by them and submitted to the Committee on Roads, Bridges and Rivers of the General Assembly of Connecticut many excellent suggestions are contained. Introducing the subject, Mr. Schutz states:

"In considering the question of automobile legislation it should be borne in mind at the outset that up to the present time all laws on the subject have been to a great extent experimental. The State legislatures found themselves suddenly confronted by a new condition. A force destined to revolutionize traffic was abruptly let loose upon the highways; machines much more powerful than the early steam engines were created and entrusted to inexperienced hands for operation; something had to be done to protect the public and the frightened horse from the 'gasoline dragon.' Police regulations, more or less elaborate, were hastily enacted to fit conditions then most imperfectly understood. Just as the science of the motor car has developed, so we have every reason to believe will the legislation upon the subject become more scientific and better adapted to the needs of the public." Following are extracts of paramount importance:

"Are Not the Roads Made for Use?"

Is it not better economy to build our roads and keep them in repair to accommodate the new conditions rather than close our highways to the march of progress because a few of the property owners along these highways object to the dust and smell? If the roads are properly built and maintained at the expense of the whole State the dust nuisance can be reduced to a minimum, and the burden of repairing the roads would be taken from the towns that cannot afford to maintain them.

The motorist frankly admits that his machine wears out the roads, and he is ready and willing to pay his fair proportion of the cost of maintenance, provided the fact is not lost sight of that the lumber team and coal cart also wear them out.

Points to Be Covered by Automobile Legislation.

The principal points which recent automobile legislation is designed to cover are: (a) Proper identification; (b) control of operators by a revocable license; (c) speed regulations which shall not depend upon traps for their enforcement; and (d) revenue.

Identification by means of plates or markers is essential to the proper regulation of motor vehicles. Practically all the State laws provide for a registration of motor vehicles, or of the owners of such vehicles, and require that one or two plates, with the registration number and the initial letter of the State, be affixed to each motor vehicle. In Connecticut and in all of our neighboring States, except New York and New Jersey, these markers are furnished at cost price by the State official who issues the registration certificate, thus securing the great advantage of uniformity. In New York the State official furnishes a metal seal two inches in diameter bearing the registration number, and this seal must be conspicuously displayed upon the motor vehicle, in addition to the number, which must be displayed on the back of the vehicle, in figures not less than three inches in height. The provisions of our present law in regard to registration and the display of markers (Section 3 as amended by Laws of 1905, Chapter 282) are probably as good as those of any other State. No provision is made for identification at night, but the requirements of the Massachusetts and New York laws that the registration number be painted upon the front lamps are useless, as it is impossible to place numbers of sufficient size upon the lamps so that they can be deciphered when the vehicle is in motion. It might be well to prescribe that the markers shall be placed not less than fifteen inches nor more than thirty-six inches from the ground.

The Commissioner of Motor Vehicles of New Jersey in his most comprehensive report discusses at length this question of identification, and, while he admits that the present system is imperfect, he has no specific remedy to suggest. He gives as his opinion that a great reform may be accomplished by an interstate system of registration numbers. Should the bill for a national system of registration presented by the A. A. A. to the last Congress become law, most of the present difficulties would be removed.

Licensing of Operators.

Our present law makes no provision for the licensing of operators of motor vehicles, and in this respect differs from the laws of

most of our neighboring States. It would seem that the restricting of the operation of motor vehicles to those of suitable age, and who are able to demonstrate their ability to operate, would be the greatest possible protection to the public; and a license issue by a State official and subject to revocation or suspension if the licensee is guilty of reckless driving, or in any other way demonstrates his unfitness, would seem to be the most efficient check upon the misconduct of the automobilist. If a person operates a motor vehicle upon a public highway at a rate of speed greater than is reasonable and proper, having regard to the width, traffic, and use of the highway, impose a heavy fine and deprive him of his license, thus preventing him from operating a motor vehicle for, say, thirty days, and you would soon put a stop to all abuses.

In most States the applicant for a license to operate a motor vehicle must satisfy the official who issues the license that he is a competent and proper person to receive the same. In a few States, notably New Jersey, a more or less rigid personal examination is required, but the New Jersey Commissioner in his report advises against it. In the majority of States one desiring to operate a motor vehicle for hire must secure a special license renewable each year. Under the present New York law only chauffeurs are required to secure licenses, and no examination is prescribed. Connecticut should follow the example of her sister States in this regard and require every operator to obtain a license; this would give the State a direct control over all motorists, which could be exercised when necessary for the protection of the public, and it would also furnish an additional means of revenue.

Non-Residents.

Our present law (Section 8) provides that a non-resident, who has complied with the laws of any other State and displays the identification numbers required by such State, with the initial letter of the same, may use our highways for a period not exceeding fifteen days in any one year without complying with the provisions of our law. It may be said that if our own citizens are required to pay increased registration fees, or are to be specially taxed upon their automobiles, to pay for repairing the roads, non-residents, who do nearly, if not quite, as much damage to the roads, should be made to contribute. It would be a grave mistake for Connecticut to enact a law that would discourage residents of other States from coming here, for all our citizens, directly or indirectly, profit by their visits. Again, the drawing of State lines should be avoided as much as possible, and free passage from one State to the other is in all respects desirable. If our citizens enjoy the privilege of using the highways of New York, Massachusetts, and other sister States, without complying with the laws of those States, we can well afford to allow reciprocal privileges.

Speed Regulation and the Elimination of Traps.

It can scarcely be denied that the net result of enforcing the speed regulations of most of the automobile laws has been to swell the pockets of a few officials, without affording protection to the public or benefiting any one except these officials. The few traps set in different parts of our State have brought rich returns to a few constables, but public sentiment is opposed to this method of enforcing the statute, for it savors of highway robbery, and in nine cases out of ten it is the harmless, though technical, violator of the law who is caught and fined, while the reckless dare-devil soon locates the trap and laughingly escapes the punishment which he so richly merits. The only true test, looked at both from the standpoint of the public and of the automobilist, is whether the speed is at all times reasonable and proper, having regard to the width, traffic, and use of the highway. The only necessity for automobile regulation is to secure, as far as possible, the safety of the public by preventing reckless driving, and this can better be secured without a maximum speed limit than with it.

The disadvantages of maximum speed limits are very clearly pointed out by the Commissioner of Motor Vehicles of New Jersey in his report, and he unhesitatingly recommends their abolition. He cites a case, which came under the observation of his department, where a flagrant transgressor, who was caught by a mounted policeman, after a desperate race, and then only upon a threat of shooting, was acquitted before the magistrate because it was not proven that the vehicle was going faster than the maximum speed limit, although there was no question but what the speed was much greater than was compatible with public safety.

The claim will doubtless be made that the removal of the fixed rates of speed per hour would be an encouragement to the reckless motorist to drive his car at top speed regardless of the rights of others. A careful study of the subject has shown that the claim is not well founded; in fact, the converse of the proposition is found to be true. Maximum speed limits encourage the reckless

motorist to take every chance and to drive his car to the limit of its capacity, except where he has reason to believe that a trap has been set for him. Make reasonableness the foundation upon which speed is to be based, and the violator would never be safe from arrest and punishment, because any bystander would be competent to testify whether the motor vehicle was being operated recklessly or so as to endanger the safety of the public, instead of leaving the enforcement of the law to an official armed with an inaccurate stop-watch, and who is financially interested in the outcome of the prosecution.

It is a most significant fact that in no State where the arbitrary maximum speed limit has been abolished has there been any disposition to return to the old standard; in fact, the entire tendency of recent legislation is strongly in the direction of abolishing these arbitrary limits. The revocation of a few licenses to operate motor vehicles, with a heavy fine or imprisonment for reckless driving, will do more to cure the evil in Connecticut than a hundred traps working to their fullest capacity!

Revenues.

There is a general and very natural disposition to tax automobiles for the upkeep of the State highways. An equitable tax for this purpose certainly would not be objected to by automobile owners, but it is no easy matter to decide upon the basis for such taxation. One thing seems certain at the outset. If automobiles are to pay a State tax they should not be subject to local taxation. Our Supreme Court has many times reiterated the proposition that "It is and ought to be the general policy of the Legislature to avoid double taxation of the same property."

Some suggest that the taxation should be according to horsepower. The objections to this method are that ratings differ materially according to the maker or the place of manufacture, and that a heavy low-powered car may do more damage to the roads than a light high-powered one. The objection to taking weight as the basis is that the heavy electric vehicles and motor trucks, capable of only very low speed, do much less damage than the lighter but higher speed gasoline cars.

A plan which has been suggested, and which would accomplish the desired result without doing violence to established principles of taxation, is for each automobile to be taxed like other personal property, in the town where the owner thereof resides, and for the towns to remit to the State a fixed proportion of the taxes thus received to be used for highway purposes.

So far as we have been able to ascertain, no State has yet passed a law laying a special tax on motor vehicles. Several have materially increased the license fees for the purpose of revenue, and in Vermont, Rhode Island, New Jersey and Pennsylvania, as well as many of the other States, all fees and fines are applied by the State to the maintenance of State roads.

ONE YEAR IN WHICH TO REGAIN YOUR NUMBER.

ALBANY, N. Y., April 29.—That bill of Senator Wemple's to permit the Saratoga Lake Bridge Company to charge 25 cents toll for autos crossing the bridge, which is a rate twice as large as that charged any other vehicle and in direct contravention of the Whitney law enacted this year providing that the rates for motor vehicles over toll bridges and toll roads shall be uniform with those charged animal-drawn vehicles, got out of the Commerce and Navigation Committee in some peculiar way last week, but was recommitted on motion of Assemblyman Whitney, of Saratoga. It cannot now get out except through the Rules Committee, and it is not expected that the Rules Committee will take it up.

Senator Davis, of Buffalo, has introduced an amendment to Section 1, Subdivision 4 of the motor vehicle law, which reads as follows:

"If within one year from date when such seal shall have been returned, and the person to whom such seal was issued shall become the owner of a motor vehicle, and shall file in the office of the Secretary of State the statement required by Subdivision 1 of this section, and pay the fee required by this section, and, in such certificate, or at the time of the filing thereof, shall request the reissue to him of a seal bearing the same number as the seal surrendered, the Secretary of State shall issue to such a person a seal bearing the same number as that borne by the seal returned. After the expiration of one year such secretary shall issue to any persons applying therefor, and filing the proper statement, and paying the fee of \$2 as provided in Subdivision 1 of this section, bearing the number of any seal so returned and unissued."

AMERICAN CARS IN NEW BRUNSWICK.

United States Consul-Hebhard Willrich, St. John, tells of the progress of automobiling in New Brunswick Province, the first car, an \$800 runabout, having been introduced in 1903. There were eighteen autos owned in the Province in 1905 and double that number in 1906. An association formed met with considerable success in securing funds for the improvement of the highways, the amount obtained being \$140,000 which expenditure has placed the Province roads in fairly good condition. Along the St. John river the scenery is unsurpassed. Some seventy cars are now owned in the Province, the great majority of which belong in the class ranging from \$2,000 to \$3,000. The remainder, with the exception of several French cars, are light touring cars and runabouts, ranging upwards from the buck-board. Fully 75 per cent. of the cars are of American manufacture, despite the import duty of 35 per cent.

Consul Willrich concludes: "Now is the time and opportunity for American manufacturers to cultivate and exploit this field, practically untouched. American machines are well introduced and have a big lead. They should retain it. The topography of this province demands machines that are both light and strong and good climbers, as the roads are up and down with seldom a long stretch of level. The scenery of this country almost everywhere is exceedingly attractive, hence offers much inducement to outdoor locomotion.

"As one of the best means of securing an increased sale of American machines, I would suggest the early establishment here of an American automobile agency having cars of different grades and prices in store, in charge of a competent mechanic able to make ordinary repairs. St. John, as the chief distributing point for the lower provinces, would be the proper place for the establishment also of a commodious and well-equipped garage, and I have no doubt that an investment here of that sort would prove a paying venture."

SOME GERMAN AUTOMOBILE STATISTICS.

United States Consul H. W. Harris, of Mannheim, advises that the *Deutsche Bergwerks Zeitung* recently published an interesting review of the German automobile industry, and especially recounting the progress made during the past six years, from which he compiles the following:

The review shows that the automobile, regarded for some years in Germany as a luxury only for the nobility and the very rich, is rapidly becoming popular and creating a demand for light vehicles of the runabout class. The many auto exhibitions which have been held, touring contests, and other events have greatly aided the industry as a whole. A more tolerant view on the part of legislators, the courts and police officials, and the public press has tended in the same direction. The value of the total product of the German automobile factories for the past five years is stated to have been as follows: In 1902, \$2,613,000; 1903, \$3,808,000; 1904, \$9,520,000; 1905, \$16,660,000, and 1906, \$23,800,000.

The value of automobile imports into Germany in 1906 is stated to have been about \$4,284,000, as against \$5,236,000 of exports. A larger proportion of this foreign trade has been with France than with any other single nation. For the six years, 1901 to 1906, inclusive, the imports of automobiles from France increased from \$214,000 to \$2,618,000, and the exports of machines thereto during the same period rose from \$119,000 to \$952,000. The total automobile exports from Germany to all countries have been from year to year somewhat larger than the total imports, the relative rate of increase being in favor of the export trade. It is stated that the German automobile industry, under like tariff conditions, will be able in the future to fairly compete with the same industry in other countries.

From the *Masonic Standard*: "Noble James McGee, of Mecca, has accepted an invitation to command a division in the Shrine parade at Los Angeles. The division chiefs, instead of bestriding barbed steeds, will mount wild and untamed automobiles."



WHAT HAPPENED ON

THE ARLES-SALON ROAD

NOBODY really knows what actually did happen. We were bowling along in a light car, over the same famous bit of roadway on which the 200-horsepower Darracq first broke the record for the flying kilometer, when suddenly there was an abrupt stop of everything which had previously been in motion. The great pebbly plain of the Crau stretched north, east, south, and west in all its lonesomeness, with no one to give us a helping hand or to tow us into a Salon garage, a good twenty kilometers away. It was a discouraging prospect.

Everything was put out of business for the moment, the accumulators had turned over and the occupants of the front seat and the tonneau all but precipitated to the ground. Visions of a gripped piston, a broken crankshaft and everything else to be thought of passed through the minds of all of us in the brief interval required to get over the shock and the surprise. It was but a moment of time before the *manivelle*, as the French neatly call the cranking-handle, was gently turned and went over with its accustomed ease—nothing wrong there. A good strong shove on the automobile showed that it rolled over the smooth road without indicating that anything was wrong with the transmission. With these facts well established and with a general lookover of the gasoline supply pipes, the wiring, and the thousand and one little intricacies that only the habituated chauffeur can diagnose with a glance of the eye, the current was switched on—the brakes hard on meanwhile—and a cautious effort made to put the motor *en marche*. The unexpected happened! Or, rather, nothing out of the ordinary happened; the thing went off as though it had only been stopped while we were taking a fifteen minute look around the landscape. This was one of the capricious moods of the automobile, moods which, if not frequent, are ever on the eve of being sprung on the unsuspecting chauffeur. "*Sont capricieuses comme les femmes*," said an old shepherd standing by, who with his flock of a couple of hundred *moutons à laine*, are almost the only residents of this great stony plain. And we were inclined to agree with him. This particular automobile, it is only fair to say, ran another three thousand kilometers without the least involuntary stop. It had been done nobly, and was to be forgiven.

A Stop Which Led to Old World Scenes.

But for this involuntary stop in the Crau it would have slipped our minds entirely that we were on classic if not hallowed ground, for we were bound Italy-wards and had never a thought but to make the *vitesse* and get over the frontier at Vintimille as soon as possible. As it was, someone of the party suggested that we spend the night at St. Rémy, just over the crest of the purple Alpilles to the right, the last spur of the French Alps, as they bury their fore foot in the shallow plain of the Bouches-du-Rhône. It was the artist who suggested this, for she had memories of a long summer spent in the household of an estimable bourgeois of St. Rémy and had not forgotten either the classic excursion to Les Baux for its shepherds' midnight fête, or to the home of the poet Mistral, and the thousand and one marvels of this all-but-unknown tract of country, as weirdly strange and full of character as any similar area to be found. It is a district in which the tourist *en auto* might spend all his available leisure to advantage.

Where Hemérys Break Records and Tourists Speed.

By all means the thing to do was to spend the night at St. Rémy; the chance might not come our way again, involving so

little forethought on our part. We turned off the great national thoroughfare, the Arles-Salon road, with the memory of the most superlative bit of roadway in all the world burned well into our brains. Almost the whole distance from Arles to Salon, something like forty kilometers, is as straight as an arrow and as flat as the proverbial billiard table. In addition its surface is as smooth and hard as if it were of marble and about as dazzlingly white as that variety of which tombstones are made. It is, indeed, the finest bit of natural roadway in all the world, and we were glad indeed, when we came to think of it, that we had not scorched over it at "80" or a "100" an hour (kilometers, not miles) as is mostly done by passing automobilists. Les Baux called us, however, and the thought of the good things to eat that night and the comfortable quarters to be had *chez* Teston, at the Grand Hotel de Provence, did the rest, and Italy for the nonce was far from our minds.

Les Baux, reached only by road from Arles or St. Rémy (here's where the automobilist has the advantage of the traveler by rail), is one of the reminiscent wonders of the past that tourists to the Riviera should by no means give the go-by, as they mostly do. For that matter, they should not neglect Arles and Avignon. They are something more than dining and sleeping places, though not many seem to realize this until they get on the spot. There is so much history connected with both these cities of celebrated art that the wonder is that they have not become really popular shrines before now; Arles with its Roman arena, almost as great as the Colosseum, and Avignon with its Palais des Papes are certainly suggestive of much in the way of attractions that the most callous scorcher will hardly want to pass by when he comes to think of them.

Mem.:—Don't pass by Arles, Avignon, St. Rémy or Les Baux, or you will miss much of what you come abroad for.

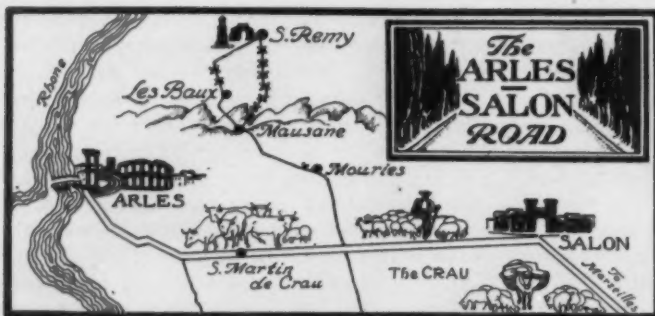
In the Home-land of the Haughty Seigneur.

The distances between these charming Provençal towns are astonishingly small and a week's tour among them, between Avignon and Marseilles and westward to Nîmes, will give one at least a score of surprising delights in the way of quaint sights and scenes, and good eating and drinking at modest little inns, which will be a revelation to those who have hitherto been frequenters only of the resorts.

Les Baux is a mere weatherworn souvenir of a city whose glory has long ago passed into foggy oblivion. Once its seigneurs held sway over sixty Provençal towns and cities whose inhabitants didn't dare to call their souls their own but went and laid them at the feet of their feudal lords, the seigneurs of mouldering old Les Baux. Now, though



MOUNTAIN ROAD TO LES BAUX.



a ruin, Les Baux is a sight so wonderful that it is only comparable to Pompeii. It is virtually a dead, buried relic of a once proud and wealthy metropolis, though, unlike Pompeii, it sits imposingly on a rocky peak, with the great plains of the Crau and the Camargue stretching away seaward, and the rich, alluvial prairies (where at Chateaufort is the largest market for primeurs, or early vegetables, in all France) to the north, with now and then the glint of the gold dome of the cathedral at Avignon and the sky-line of the Palace of the Popes showing through the sunlight like a veritable mirage.

It's a long, hard climb up to Les Baux from whichever side one tackles the mountain road. It is six or eight kilometers up a regular mountain side, with rocky gorges, picturesque defiles and all the accessories which go to make up a picture by Gustav Doré. As one swings around the last hair-pin turn and dodges the last flock of sheep and their worrying dog he comes at once abruptly on the little Place of Les Baux, where now two hundred inhabitants pass to and fro, replacing the sixteen thousand of another day.

There is nothing quite so weird and strange as this in the center of a thickly-populated region round about in all France. There is a hotel of sorts—a very poor sort, and there is an apology for an "auto garage," as you learn from a great white banner swung to the breeze in front of the Hotel Monte Carlo. It's nothing much, but you may stable your machine along with the omnibus which makes the round twice a day from Arles.

Charms of a City of the Misty Past.

The old defences, the fortress-chateau, and the city walls are defined as well as one might expect of anything which has had to stand up for centuries against the icy blasts of that terrible "norther," the mistral. For the most part the town is a ruin and a wilderness, but here, there and everywhere a turn of the shovel or even a sharp glance of the eye will point out buried evidences of the splendor that once existed.

Once proud and revered seigneurs and fair ladies stalked through the grim halls of the chateau where an occasional antiquarian toddles to-day, but for the most part it is the abode of owls and other nocturnal rambles which must give the shudders to anyone venturesome enough to go up there in the night.



FROM CLOISTER TO SHEEPFOLD, ST. REMY, IN PROVENCE.

The chief evidences of existing splendor are found only in the "Temple," a sixteenth century religious edifice, which is a luxurious ruin if nothing more. "*Post Tenebra Lux*" may be read over its portal, but one will have to build up its past for himself, as the religious functions of Les Baux to-day, such as the shepherds' midnight fête at Noël and the Fête de Vincent in January are more strangely weird and fantastic than they are splendid and magnificent.

From all parts of the surrounding country, and often from the Alpine regions, come the shepherds to Les Baux for the midnight mass at the Fête de Noël, that they may pray and be prayed for; that they may be deserving of a growing prosperity, and that their flocks may increase in number, and, above all, that the price of wool will continue to be as good as it has been—and better. Very practical this, but no one who has ever seen the weird midnight processionings with lighted candles and lanterns and great rows of men, women and children climbing up to the hill-top town of Les Baux from the lower plains at the base will doubt the sincerity of it all. Prayers need not be made in city churches to be effective, indeed the other kind seem to be the most efficacious.

Where Mistral Found His Inspiration.

The round of the sights of Les Baux, which are many, will occupy one hour or three as you choose, and then there is the "*Trou di Fado*," or the "*Grotte des Fées*" or the "*Fairy's Well*," or whatever you may choose to call it.

You get the pure Provençal tongue hereabouts almost to the exclusion of the French, and if your demand for the road leading to the "*Grotte des Fées*" is not productive of anything except a jabber, you may know that you have struck some old-school Provençal who has never been taught French and hasn't chosen to learn it for himself.

There is a two hundred and eighty meter drop down into St. Rémy on the north side of the Alpilles, where all that is lacking at Les Baux awaits one and his automobile.

On the occasion of which we write we made the nine kilometer descent just as dusk had fallen. There is little or no twilight here and night comes with a rush. Our lanterns and our phares were alight and the effect was as strange and spectacular as a stage-setting. Nothing surprising happened and we made all the lacets, or hair-pins, safely, taking corners slowly, as indeed one must, and just escaping a flock of sheep by the thickness of the paint on our mud-guards. Every rock and tree stood out in bold relief, and though the hour was not yet six it was as dark as a pocket, and still as if it were the desert.

We arrived safely before the door of St. Rémy's excellent hotel just as the soup was being served and, after the necessary "wash and a brush-up," did full justice to Teston's Provençal cooking and slept the sleep of the just in a great four-posted bed in an apallingly spacious apartment overlooking "*les antiquités*," a brace of Roman relics—a great mausoleum-like tomb and a triumphal arch—whose history is lost in the night of time.

St. Rémy is *toujours une ville morte*, say the inhabitants, but for all that it is as delightful and sleepy an old-world town as one will see on a long round of French travel. It would be an ideal place to while away a month, or a year for that matter, and it would doubtless wear well.

(To be concluded.)



A STREET IN LES BAUX.

HAPPENINGS IN THE BUSY LAND OF CLUBDOM

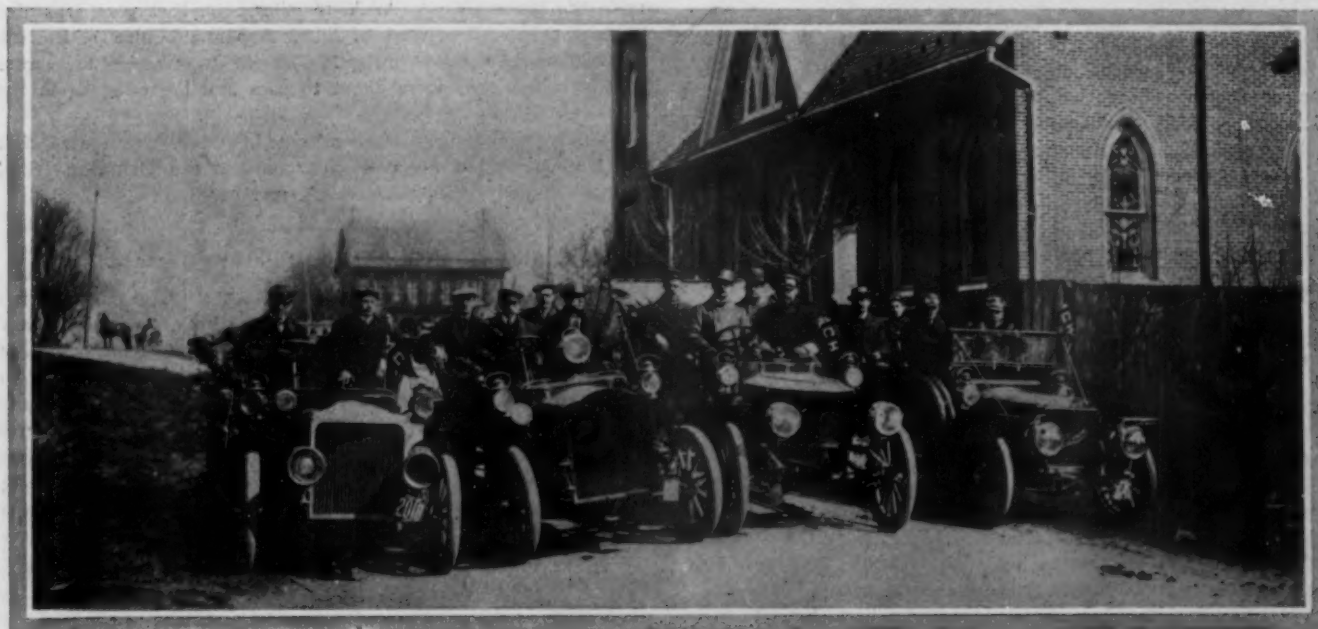
Windy City Clubmen Prepare for Season's Campaign.

CHICAGO, April 30.—Preparations for the entertainment of the Glidden tourists when they reach this city on July 13 were inaugurated by the action of the Chicago Automobile Club in instructing its racing committee to arrange a short program of events for that day, providing a suitable track can be obtained for the purpose. Chairman C. E. Gregory has in mind the old Harlem race course for the purpose, providing the expense of putting the same into shape for racing is not too great.

Plans for the observance of Orphans' Day—June 12—were formulated by the Chicago Automobile Club at the last directors' meeting, and the following committee was appointed to take charge: Joseph F. Gunther, chairman; Frank H. Pietsch and C. E. Gregory. Progress on the construction of the club's new house on Plymouth court was reported at the meeting, and there is every evidence that it will be ready by May 30.

The Bay State Meet to Have Two Long Races.

BOSTON, April 29.—Entry blanks are being sent out by the racing committee of the Bay State Automobile Association for the fourth annual race meeting to be held on the Readville track on Memorial Day, May 30. The programme is quite different from those of previous meetings in that there are to be only two events: races at 100 and 50 miles respectively. The 100-miles race is open to all stock gasoline touring cars. Mufflers, mud guards and lamps may be removed, otherwise the cars must be as per maker's catalogue. Each car must carry one passenger in addition to the driver. The fifty-mile race is open to all stock gasoline runabouts and the conditions are the same as for the touring car race. Silver prizes are to be given to the first three to finish the touring car race and the first two in the runabout race. The committee is well pleased with the response among owners of cars and expects to have as many as twelve machines



COMMITTEE OF THE HARRISBURG MOTOR CLUB THAT SELECTED THE COURSE FOR THE ENDURANCE RUN OF MAY 6-7.

First White steamer on left—R. H. Johnston, of the New York Motor Club, who will distribute the confetti on the run; second White steamer—R. C. Halde-
man, chairman of the committee; W. R. Douglass, I. W. Dill, and C. C. Crispin; Stanley car—George G. McFarland, Vice-President O. C. Robinson, L. A. Fannel,
and Andrew Redmond; Pullman car—E. G. Irwin, R. L. Morton, Charles Cumler, and J. Aldrich.

The contests committee of the Chicago Motor Club, which will have charge of the second annual Elgin-Aurora reliability run, the Algonquin hill-climb, and the Cedar Lake economy contest, and which will be run jointly with the Chicago Automobile Trade Association, has been appointed and is constituted as follows: Charles P. Root, chairman; B. C. Hamilton, J. V. Lawrence, B. C. Buxton, F. W. Cornish, H. P. Branstetter, and J. C. Zimmerman.

A. C. A. Jamestown Tour in October.

NEW YORK, April 29.—The Runs and Tours Committee of the Automobile Club of America has decided to have its trip to the Jamestown Exposition for club members take place the first week in October instead of in June. The present plan is to tour from New York to Washington, and then take boat to Norfolk, leaving the cars at the Capital. Returning there, the route home will be more or less diversified, the exact details to be decided upon by A. L. Westgard, secretary of the club's Bureau of Tours, who will go over the route early in the summer.

in each of the races. The entries close with L. R. Speare, chairman of the racing committee, at the clubhouse, 282 Dartmouth street, Boston, May 23.

President George Refuses Re-election in Detroit.

DETROIT, April 29.—At the annual meeting of the Automobile Club of Detroit, Edwin S. George was pressed to accept a fourth term as president of the club, but declined and was succeeded by Harry Skillman, whose work as secretary during Mr. George's administration was strongly contributory to the excellent results attained. When Mr. George was first elected president of the club three years ago, it was a small organization with few members and \$600 in debts. Since then it has grown tremendously, has its own clubhouse, no debts and a snug balance in the bank, as the result of his efforts in building it up. The other officers elected were: Dexter M. Ferry, Jr., vice-president, and Garvin Denby, secretary. E. S. George was reelected to the board of directors, and C. A. Ducharme and Louis Case, whose terms had expired, were succeeded by Garvin Denby and Walter Brooks.

Such a success was made of the century run last year that the tours and contest committee decided to make it a fixture, while another proposed annual fixture is the motor-boat race off the Pine Lake house of the club. The good roads committee succeeded in building a two-mile gravel cut-off, which reduced the distance to the country house six miles, and the farmers in that district have been so pleased with it that they have agreed to contribute to the building of an additional two miles. The gain in the club's income in one year has been \$2,000, and it is intended to make a substantial outlay in enlarging the Pine Lake house this summer.

New Jersey Club Election Promises Warm Contest.

NEWARK, N. J., April 30.—Since the regular list of nominations for officers for the coming year made public by the New Jersey Automobile and Motor Club, of Newark, an opposition ticket has been placed in the field. The regular nominations were: Angus Sinclair, president; L. T. Wiss, vice-president; James C. Coleman, treasurer, and H. A. Bonnell, secretary, while W. C. Shanley is slated for president on the opposition ticket; F. R. Pratt, vice-president; W. I. Fisk, treasurer, and Leslie P. Ward, secretary. An opposition ticket was placed in the field last year, but was withdrawn prior to election. It does not seem probable that this will again be the case, so that the election on next Monday night promises to be closely contested. The opposition members of the board of trustees nominated are Charles W. Baker, E. Z. Seitz and Dr. F. B. Meeker.

Horace A. Bonnell, chairman of the club's endurance run committee, announces that twelve entries have already been made for the three-day event to be held on May 30-June 1, and has verbal assurances that this number will be increased to fully thirty in all before the end of the month.

First Banquet of a New Greater New York Club.

NEW YORK CITY, May 1.—The City and Country Motor Club of Greater New York, with a clubhouse at 306 West 109th street, held its first annual banquet Wednesday night. The dinner was tendered to the hundred founder members and the press. It marked the formal opening of the club.

There is at the present time a waiting list of about 200, whose names will be acted upon at the next meeting of the membership committee. A very novel feature of the club is the fact that ladies are eligible to membership. They cannot, however, hold any office, excepting on special sub-committees.

Final arrangements have been made and a lease for a term of years secured for the Lake Mahopac Inn. There are garage accommodations for at least fifteen cars, and there will be kept on hand stocks of spare parts, tires, oils, greases and gasoline. Sign posts will be erected by the club between New York City and Lake Mahopac for the convenience of members.

Michiganders at Grand Rapids Elect New Officers.

GRAND RAPIDS, MICH., April 29.—At the fifth annual meeting of the Grand Rapids Automobile Club the following officers were elected: President, A. A. Barber; vice-president, Alvah W. Brown; secretary, D. Emmett Welsh; treasurer, J. R. Jackson; board of governors, Fred M. Rowe, William Wurzburg, Dr. Warnshuis and the above named officers. One of the most important features of the meeting was the appointment of a committee whose duty it will be to further the cause of good roads in this vicinity. The committee consists of George W. Hart, C. C. Filberts, C. J. Bronson, W. B. Vandecar and Robert Erwin. Thirty-five new members were added at the meeting.

Adirondack Autoists Organize New Club at Sandy Hill.

SANDY HILL, N. Y., April 29.—The Adirondack Automobile Club has been organized at this place with twenty charter members, and the following board of officers: President, W. A. Hup-

puch; first vice-president, W. R. Durkee; second vice-president, M. C. Allen; secretary and treasurer, W. J. Gallagher. The club has affiliated with the New York State Automobile Association and the American Automobile Association.

Energetic efforts will be made by the club to improve the roads in this immediate vicinity. The Lake George-Glens Falls State road is in many places very dangerous to automobilists on account of the numerous sharp turns, and as it is one of the main thoroughfares from Saratoga to Lake George during the summer season, it is thronged with high power touring cars most of the time. The club is having placed at danger points on the road signs cautioning tourists to drive slow.

Indiana Automobile Club Elects Officers.

INDIANAPOLIS, IND., April 27.—What answered as the annual meeting of the Indiana Automobile Club was held to-night at the Dennison Hotel. These officers were elected: President, Louis H. Levey; vice-president, S. A. McClellan; secretary, H. H. Rice.

H. O. Smith made an address as to the necessity of organization, and R. J. Eads spoke in similar vein, dwelling particularly upon the benefits of A. A. A. membership. Reference was also made to the excellent work of Edgar Apperson before the Indiana Legislature, he demonstrating to some of its members the errors in bills which they were about to pass and the effect upon the growing industry in Indiana.

Forty new members were admitted, and it was stated that the latch string of the new clubrooms in the Dennison Hotel would always be open to A. A. A. members.

Bison Autoists Object to a City License.

BUFFALO, N. Y., April 29.—Members of the Automobile Club of Buffalo have been requested by special notice from Secretary D. H. Lewis not to pay the annual license of \$5 for the operation of automobiles in the public thoroughfares, as demanded in an ordinance recently adopted by the Common Council. Former Justice D. J. Kenefick has been retained in case the law is put to a test, which is desired by the Automobile Club. Mr. Kenefick says it is his opinion the ordinance is invalid. In all there are at least 3,000 automobiles in Buffalo. Mayor Adam this afternoon sent a communication to the Common Council dealing with this subject, in which he expresses regret at the action of the club.

Long Island A. C. Decides to Return to A. A. A.

BROOKLYN, N. Y., April 29.—At its recent meeting the Long Island Automobile Club unanimously decided to rejoin the New York State Automobile Association of the A. A. A. This action was taken after a special committee, consisting of Charles Jerome Edwards, Alfred Wilmarth and Dr. C. D. Parker, had reported the results of a conference with A. A. A. officials. The renewed activity of the present A. A. A. administration and the new distribution of the annual dues, whereby three-quarters goes to the State body and only one-quarter is retained by the national organization, had much influence in taking the club back into the A. A. A. fold. Its present membership is over 400.

Capital City Autoists Improving their County House.

WASHINGTON, D. C., April 29.—With the opening of the spring season the country clubhouse of the Automobile Club of Washington on the Brightwood Road is becoming a popular place of resort. The house committee is taking an active interest in improving the facilities of the clubhouse, as well as in beautifying the grounds surrounding it. With a view to increasing the membership a committee is now making arrangements to put into attractive shape the desirability of automobilists joining the organization. The new officers of the club are working hard to make the club a success in every way.

GREAT GROWTH OF THE A. A. A.

Fifteen State associations of the American Automobile Association are now in active operation. These eight were added to the roll at the Monday meeting of the Executive Committee, held at 527 Fifth avenue, New York City: Pennsylvania, Indiana, Maryland, Michigan, Wisconsin, Missouri, Colorado and Rhode Island. The Automobile Club of Louisville, Ky., and the Automobile Club of Rutland, Vt., were also admitted, and very shortly both clubs will have become parts of State associations now in process of formation. These additions brought the grand total of the national organization to about 16,000, with several other State bodies probabilities of the near future.

President W. H. Hotchkiss presided at the session, which was also attended by Lewis R. Speare, W. K. Vanderbilt, Jr., Jefferson DeMont Thompson, G. E. Farrington, A. G. Batchelder, Secretary F. H. Elliott, and Chairmen Charles T. Terry, of the Legislative Board, and Frank B. Hower, of the Touring Board.

Chairman Hower, of the Touring Board, reported extensively concerning the annual A. A. A. tour, to take place in July. His recommendation was that a separate class for runabouts should be included in the tour. The Executive Committee concurred and accepted a cup for the runabout division offered by Mr. Hower. The rules governing the Hower cup will be exactly the same as those for the Glidden trophy, for which touring cars only will compete.

Chairman Terry, of the Legislative Board, filed a decidedly interesting report, referring to favorable legislation obtained in various States, and also made known that not a single serious objection had been expressed to any of the provisions of the Federal Motor Vehicle bill which the A. A. A. had introduced in Congress before the close of the recent session. The proposed statute will go before the Judiciary Committee of the House of Representatives upon the reassembling of Congress, with indications of a favorable report.

Chairman Hooper, of the Good Roads Board, reported that arrangements are being perfected for a convention of officers of all associations throughout the entire country interested in the improvement of the highways. According to Mr. Hooper, the era of good roads building will soon be in full sway, many States considering the subject favorably at the present time.

Chairman Thompson, of the Racing Board, announced a session of the Executive Committee of the Racing Board, to be held May 15 at the new offices of the association, 437 Fifth avenue. The appointment of this Executive Committee was ratified, and to it was referred the entire management of the Vanderbilt Cup race and similar events run under A. A. A. auspices. This committee, in addition to Chairman Thompson, contains W. K. Vanderbilt, Jr., E. Russell Thomas, Dave H. Morris, A. R. Partridge, A. G. Batchelder, Frank G. Webb, S. M. Butler, R. Lincoln Lippitt, George L. Weiss and Ira M. Cobe.

A letter received from H. O. Smith, of Indianapolis, representing a number of well-known makers interested in the promotion of a stock touring car race, stated that suggestions for such an event would be forwarded to Chairman Thompson in time for next Racing Board meeting.

Changes in the Board of Directors included the substitution of W. F. Fuller, president of the Automobile Club of Hartford, Conn., in place of J. Howard Morse, who resigns because of an extended trip abroad, and Paul C. Wolff, secretary of the Pennsylvania Motor Federation, in place of Philip S. Flinn, who requested the change, stating that his memberships on the Racing and Touring Boards occupied all of his spare time.

MALDEN CLUB PURCHASES A HOME.

The Malden Automobile Club, of Malden, Mass., has purchased the Southmayd property at the corner of Florence and Clement streets, this city, which includes a large frame residence of nineteen rooms and about 12,000 square feet of land. About \$5,000 will be immediately expended by the club in alterations and the erection of a modern garage on the property.

WIDER SCOPE OF NEW BLUE BOOK.

Instead of comparing bulk for bulk, a better idea of the growth of "The Automobile Official A. A. A. Blue Book" can be obtained by comparing one portion in the 1906 edition with the corresponding matter in the new edition. Take as an example the index matter dealing with Erie, Pa. Last year this occupied 8 1-2 inches. In the new edition 26 inches of space are occupied for the same subject. Instead of the old map, which, in order to economize space and time had a small city map incorporated with it, there is one large city map, showing all routes for entering and leaving the city. In the old book it was only possible to give three routes, all fragmentary, whereas in the 1907 edition there are five complete routes and two alternates, making seven in all. The tourist is given a comprehensive idea of the city of Erie by a new map drawn to the proper meridian point, with captions very much extended. Instead of trying to squeeze the route map in a corner of the city map this material has been made into route maps that extend complete and independent to various centers, while the small map used in the way referred to last year has been enlarged and made to serve the purpose of showing the surrounding country on a larger scale.

This is an example of the reconstruction process that has been carried out in the book. Every section that could be enlarged and improved has been attended to, so that the progress has been not merely theoretical but eminently practical. To the New England section of the Blue Book will shortly be added Sections 1 and 3, dealing respectively with New York State and the West, and with New Jersey, Pennsylvania, the South, and the West. The three volumes are published by the Class Journal Company, publishers of THE AUTOMOBILE, Flatiron Building, New York City. The price is \$2.50 per volume.

FAVORABLE FOR THOSE TOURING CANADA.

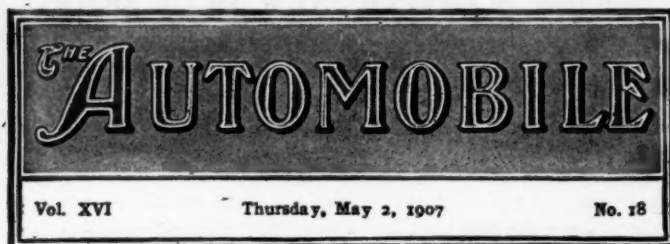
SEATTLE, WASH., April 26.—The United States Collector of Customs at Port Townsend has issued a new order concerning automobiles that are taken to Canada on tours. The new order says that to facilitate tourist travel to and from Canada automobiles may be taken into Canada, and upon reimportation to this district within thirty days will be allowed to pass the customs port without making entry.

The owner of a machine should file with the Deputy Collector at the port of exit a description in duplicates of the automobile with the maker's name and number, its retail value and the place the car will return through. A copy of the statement, duly certified by the customs officer, will be given to the tourist to be delivered at the port of re-entry. The order also says that all automobiles returning or departing by vessel should be carried as baggage, and not entered on the ship's manifest.

THE SHORT AUTO ROUTE TO THE JERSEY SHORE.

SOUTH AMBOY, N. J., April 29.—By granting the Jersey Central Traction Company the right to lay tracks on the draw of the new Perth Amboy-South Amboy bridge, last Wednesday, the Middlesex Board of Freeholders practically completed their work of establishing a short automobile as well as trolley route to the Jersey shore. The trolley company will light the bridge at night with 16-candlepower incandescents, placed 100 feet apart, and will furnish power to turn the draw. The company pays the county \$5,000 cash for a twenty-year franchise. The work of putting steel spans in the bridge to replace part of the wooden structure has been proceeding rather slowly, and it will probably be late in the summer before the bridge is thrown open to traffic. The Freeholders are having a new macadam road laid from South Amboy to Keyport. This, with the bridge and the "Hole in the Wall" repairs, will complete the new shore route.

Germany proposes to form a standing auto division in its regular army. It is said to be a pet plan of the emperor.



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Passing of the Horse as Cab and 'Bus Power.

From the time that the first automobile made its appearance on the scene the passing of the horse has been freely predicted. So freely, indeed, that it probably must be a laughing matter to the horse himself by this time, for the prevailing prices of horseflesh have seldom been higher than during the period that has marked the reign of the automobile. According to some of the prophecies, the genus was to vanish from the face of the earth completely, but after the better part of a decade its hold on existence does not appear to have been seriously shaken. The truth of the matter is that the effect of the automobile on horse traffic only began to be visible within the past year or two in the gradual appearance of more and more commercial motor vehicles. But at best the inroads made by the latter have been sporadic and not of great moment even in the aggregate.

It has remained for cab and 'bus-using communities such as London and Paris to sound the death knell of the horse in the field in which he has been most numerous. London boasts of between 7,000 and 8,000 'buses, and in less than two years at least 1,000 or more have been transformed into mechanical vehicles, which alone means that 6,000 horses have been taken off the streets. In Paris there are 800, of which 100 are now mechanical—a matter of 900 horses less, as Paris 'buses are drawn by three and three teams are used in relays. Of the 10,000 cabs that Paris can boast, 2,000 are already motor-driven, and both London and New York are seriously awakening to the motor cab. At the rate at which the two foreign cities are at present progressing in this direction, scarcely half a decade will pass before the

horse-drawn public service vehicle will be a thing of the past. In those two cities alone this means the emancipation of some 60,000 horses—probably more—so that it would seem that at least some of the predictions regarding the passing of the horse have not long to wait for their complete fulfillment.



Coming of the Poor Man's Automobile.

Ever since the automobile first outgrew its original status of an uncertain plaything only to be toyed with by the ultra wealthy there has been a constantly increasing contingent who have confidently looked forward to the coming of the "poor man's automobile." Just what financial limitations may be considered as sufficiently defining the term in a country where the per capita wealth is so high, is a query not to be answered off-hand, but current opinion has it that \$500 or thereabouts is a figure at which every man can afford to have his own car, some estimators naturally dropping considerably below this while others consider that an additional hundred or two would not bring it beyond the category bounded by the title. Opinion likewise differs as to just what should constitute the chief features of such a car, but views differ as widely in this as in the field of the larger cars, so that it would be difficult to reconcile them, though it may be added that air-cooling and the two-cycle motor predominate very largely, for the popular automobile must be a simple machine.

At first sight it appears ridiculous to broach the subject of the poor man's automobile as being any nearer fulfillment at the present moment than it ever has been. Well-known cars that sold for \$3,000 but three years ago have gone up fully 40 per cent. and far more of them are sold now than was the case at the lower figure; several that started at \$2,500 only two years ago have risen to \$2,800 and \$3,000, and the same tendency has been noticeable throughout regardless of the class to which the car belongs. Better materials and better construction mean better cars, but they cost more; the automobiling public has demonstrated its willingness to meet the makers on the price question and the latter have responded generously in the matter of improvements. On the other hand, there has been evolved a totally different style of machine during the same period, variously denominated the "buggyabout," the "farmers' automobile," and the like. With their simple construction readily understood by the average man and easily repaired by the wayside blacksmith, these cars would certainly seem to represent the entering wedge that means the coming of the poor man's automobile.



Regulation Needed in One Particular.

But a year or two ago, the extent to which the municipal governments of such foreign cities as London and Paris went to in restricting the automobilist doubtless appeared to be the height of absurdity to the average American autoist. Take, for instance, ordinances against the production of an undue amount of smoke; to an American such a regulation savored of nothing short of absolute tyranny. To haul a man up in a police court and either cut his ride short altogether by requiring the deposit of his machine, or mulcting him roundly for a fractional violation of an arbitrary speed limit was certainly bad enough, but to pile it on by making him pay for creating a bit of smoke was beyond all reasonable conception of the needs of the case.

And so it seemed then. Such ordinances are rigidly enforced abroad in the two cities named, the duty devolving upon the bicycle police in Paris. At a conservative estimate New York City can now boast of anywhere from 10,000 to 17,000 automobiles, a large number of which are in constant daily use, and any autoist who has much occasion to pass along streets frequented by cars can appreciate the need of an anti-smoke ordinance. It is not unusual to see a cross-walk lost to view by reason of a standing car belching forth volumes of ill-smelling vapor. New York's chauffeurs are so careless in this respect that many would be up several times a day were the French rule applied.

DETRIMENTAL GOOD ROADS LEGISLATION.

ALBANY, N. Y., April 29.—It would appear that there might be some interference with the annual appropriation for good roads building, which information will be disappointing news to all road users of the Empire State. Commenting upon the situation, Oliver A. Quayle, president of the New York State Automobile Association, to-day said:

"From present indications, legislation effecting the matter of good roads construction in the State of New York will be considerable of a disappointment to the users of automobiles.

It has been supposed that the policy of this State with reference to the matter of highway construction had long since been definitely fixed, and that with greater experience would come more effective methods. A sort of self-appointed committee of three—consisting of A. R. Shattuck, a prominent automobilist; W. Pierrepont White, of Utica, a friend of the farmer and a good roads agitator, with Frank D. Lyons, of Binghamton, a politician and an ex-employee of the State Engineer's office—has been most active before the Legislature this year in urging the appointment of a commission which it was intended would supervise the construction and maintenance of the State highways. This agitation has worked itself out, not as originally intended, but in the form of two bills now pending before the Legislature, appropriating funds for good roads construction. The appropriation of former years is materially reduced or entirely done away with. The passage of these bills in their present form would not only arrest further progress in good roads building, but would, in some instances, necessitate the abandoning of work already begun."



STATE ENGINEER SKENE.

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State Engineer Frederick Skene has had considerable experience in good roads construction, having given special attention to the subject of oiled roads, his experiments having developed results sufficient to justify utilizing them in practice. Mr. Skene is a resident of Astoria, L. I., was educated in the public schools of Long Island City, received the degree of B. S. at New York University in 1896, and the degree of C. E. after one year of post-graduate course in 1897. Appointed to a place in the County Engineer's office of Queens County in 1897, he remained until January, 1898; then was appointed an assistant engineer in New York City after the consolidation, and has been in charge of the engineering office of the Bureau of Highways, Borough of Queens, since 1899. Mr. Skene was a member of the Board of Governors of the Municipal Engineers' Society in the first year of its existence, and is still a member of the society. The impression is general that he is exceedingly well qualified for the office which he now holds, and there is a pronounced sentiment that he should not be hampered in carrying out the work of improving the roads of the State, begun last year, and now in danger of interference from a somewhat unexpected source.

PERCY OWEN AGAIN HEADS TRADE ASSOCIATION.

At the annual meeting of the New York Automobile Trade Association, which took place last Friday night, Percy Owen was unanimously re-elected president for another year, the other officers being Frank Eveland, first vice-president; E. S. Partridge, second vice-president; W. P. Kennedy, treasurer; E. V. Stratton, secretary and general manager, and Carl H. Page, John F. Plummer, C. Andrade, Jr., Frank Eveland, C. R. Mabley, Peter Fogarty and W. H. Haradon comprising the board of governors. The association expects to be established in its new headquarters in the Motor Mart, at Sixty-second street and Broadway, within a short time and will then begin an active campaign which will be managed by Mr. Stratton.

AMERICAN IMPORTERS' SOCIETY ORGANIZED.

An American Automobile Importers' Society is a reality, and an importers' automobile show a possibility. Fourteen prominent importers have united to form the nucleus of the association, of which G. H. Rheims is temporary secretary, and an effort is being made to enlist twenty or thirty more automobile importers in the cause.

"We have not united to fight the Licensed Association," said Percy Owen, of Bianchi fame, to THE AUTOMOBILE representative. "Our aims are to unite all importers, irrespective of their connection or otherwise with the Seldenites, in an association which will have for its main object the promotion of the interests of importers of foreign machines. Most of the daily papers and a section of the technical press has made capital of the statement that we are to fight the Licensed body; such is absolutely incorrect."

An interview with G. H. Rheims, of the C. G. V. firm, brought forth the statement that the new society had been called into existence primarily because of the changed dates for the New York independent and licensed shows. No European models will be available for show purposes until immediately after the Paris Salon, which closes its doors December 1. New York importers will thus be effectively debarred from exhibiting their 1908 wares at the coming shows as if Maxim guns were across their path.

"We shall be obliged to hold a separate show," said Mr. Rheims, "some time after the two regular New York exhibits. Particulars are not yet available, but with such firms as Panhard, Renault, Westinghouse, Mercedes, Delaunay-Belleville, Mors, Bianchi and C. G. V., as well as the probability of the remainder of the importers joining in, there is every ground to believe that we shall have a successful show. I do not believe, either, that the holding of our exhibit after the regular shows will affect our sales."

"As a compensation for being debarred from the Madison Square show," said Secretary Butler, of the A. C. A., "the A. L. A. M. has granted the use of the Madison Square Garden from December 28 to January 4 for the holding of a show of licensed and unlicensed importers."

It appears that the conditions on which the use of the Garden is granted is that the exhibitors in the Importers' Show shall not take part in any other automobile exhibition in New York.

In reply to a query on this point, Mr. Butler declared that he did not think any of the firms would agree to such a restriction. "The date, too," he continued, "is far from being satisfactory, and it is not at all certain that the Importers' Society will accept the Garden under such conditions."

AMERICAN CAR FOR HERKOMER TOUR.

The Herkomer list has closed with a total of 170 entries, ten more than last year. America will be represented by a Rambler car to be driven by Carl Hirsch, a publisher and sportsman of Constad, Baden, Germany. Mr. Hirsch was in Chicago recently and made arrangement for the shipment of a 40-horsepower, 4-cylinder touring car from the Kenosha factory of the Thomas B. Jeffery Company. Late entries are received on payment of double fees until May 15. England only sends four cars into the fray this season, instead of the stately list last year; two are Napier of six cylinders, one to be driven by Miss Leavitt, the other by Cecil Edge; the third car is Robertson Grant's Argyll, and the fourth Director Loeser's Belsize. France is represented by a Renault, a Mercedes, a Berliet and a De Dietrich; Italy only by an Isotta Fraschini, although entries comprising cars of all makes have been received from Germany itself. The Dutch entries are somewhat amusing, two Mercedes and an Adler. Both Herr Ladenburg and Dr. Stoess, winners of the contest last year, are also down to participate, and at the present writing they complete the list. Whether there will be any important additions between now and May 15 at the increased fee is problematical.

A. C. A. TO HOLD A SEALED BONNET TEST.

Beginning June 19 next, the Automobile Club of America will undertake a four days' test open to all listed cars, whether of domestic or foreign make. It is to be known as a "sealed bonnet" contest—a title that speaks for itself. But in addition to sealing the bonnets of the cars preparatory to the start, the transmission cases, coil boxes and sundry other parts will also be sealed, and no adjustments, repairs or replacements of any kind other than tires will be permitted during the course of the contest. There will be no restriction on either the fuel or water supply. The total distance is to be 600 miles for all cars except runabouts in Class A, for which the distance will be 700 miles, to be covered in daily stretches of 150 and 175 miles respectively. Each entrant will be required to furnish a competent technical observer who will be assigned to a car other than that of the entrant, and the assignments of observers will be changed each day. The prizes are to consist of silver cups to be awarded to the winners in each class, in addition to which certificates of performance will be awarded to those who desire them.

The classification is as follows:

Class A. Stock cars complete without tops listed at \$3,000 and over.

Class B. Stock cars complete without tops listed at \$1,500 and less than \$3,000.

Class C. Stock cars complete without tops listed at \$1,500 and under.

Cars in class A must make a minimum average speed of 18 miles an hour; in class B an average speed of 16 miles an hour, and in class C of 14 miles an hour; runabouts in class B being required to make the same average as touring cars in class A, or 18 miles an hour. Cars violating legal speed limits will be disqualified. Each car must be equipped with an odometer and must be placed in the custody of the committee in the club garage every evening and at which the start and finish will take place each day.

YALE'S AUTO CLUB HAS A MEET.

NEW HAVEN, CONN., April 29.—The first racing meet of the newly organized Yale Automobile Club was held April 27, at the Branford Driving Track. The feature of the meet was the performance of a 35-horsepower Oldsmobile roadster driven by William Folberth, an expert driver from the factory. Over 75 cars were present at the grounds, while the attendance was over 1,000. One of the features of the meet which created unbounded amusement was the "Beerobstacle races," in which the occupants of the cars dismounted at the end of each lap and each drank a stein of beer, re-entered the cars and repeated the performance for three laps.

In the finals of the three-mile open championship between a Stoddard-Dayton, L. C. Phipps, '07, driver, and the Oldsmobile, Folberth, driver, the Olds won in 4:45 2-5.

The race for the college championship between L. C. Phipps in a Stoddard-Dayton and G. H. Townsend in a Thomas was won by Phipps; time, 4:53 3-5.

Following the races the members of the club were banqueted in the Branford Casino, where plans were laid for a hill climbing contest to be held in May.

WILL DEMONSTRATE FOR THE DOCTORS.

ROCKFORD, ILL., April 29.—The great advantage of automobiles for the use of physicians is to have an unusual demonstration in this city next month on the occasion of the meeting here of the Illinois State Medical Association. The local auto agents have arranged to have a large variety of machines suitable for doctors' use, and their utility and capacity for time making, hill climbing and in traveling over all kinds of roads will be demonstrated. It is expected that 1,500 doctors will be in attendance at the meeting and will witness the auto tests. The country doctors rapidly are taking to the use of the machines.

RULES FOR THAT STOCK CAR RACE.

INDIANAPOLIS, IND., April 29.—The technical members of the Racing Board of the American Automobile Association met with a number of Western automobile engineers of prominence in this city last week. At the meeting steps were taken preliminary to drafting a set of rules intended to govern a race for stock touring cars which will be held some time after the Vanderbilt race. That little was accomplished at the meeting was due to the fact that Edgar Apperson, of Kokomo, one of the leading members at the conference, was taken suddenly ill. This caused an adjournment, and a meeting will be held in Chicago next week.

Only a few minor details were taken up and nothing definite was decided upon. The question as to whether or not foreign cars will be allowed to compete is one of the most important to be settled. It is understood that a number are in favor of foreign cars competing.

Henry Ford, who drove to Indianapolis in a Ford runabout from Detroit through rain and mud; E. R. Thomas, of Buffalo; and A. L. Riker, of Bridgeport, Conn., were the representatives of the A. A. A. at the meeting, while H. O. Smith and G. A. Weidley, of the Premier Motor Manufacturing Company; Elmer and Edgar Apperson, of the Apperson Automobile Company, and N. H. Van Sicklen, of Chicago, were others present at the conference.

It is expected that a large number of six-cylinder cars will be entered in the competition and these will be given special consideration in the plans. It is generally understood that a large number of Western manufacturers are intending to bring out six-cylinder cars for next season.

NEWS FROM THE INDEFATIGABLE MORGAN.

W. J. Morgan, writing from Jacksonville, Fla., denies the printed report that the Ormond-Daytona beach was ruined by a recent big storm. The Senator states that while the storm took away all the telephone poles and mile posts, and also the piers at Seabreeze and the small grandstand in front of the F. E. C. A. A. clubhouse, the beach itself came through the ordeal in fine shape.

Concerning the road from Jacksonville to the ocean, Mr. Morgan says: "The road will be built at once, and so confident was I of its worth that I agreed to build the highway for the tollgate privileges and sell it to the county at the end of five years at its first cost. However, the tollgate proposition did not meet with favor, and the County Commissioners are going to do the building and make it a free road. It will be at least 20 feet wide all the way to Atlantic-Pablo beach, some 20 miles, when it will then be possible to have a natural ocean boulevard of 60 miles or more, running direct to the North River, near St. Augustine, which either will be bridged or boat service provided by the time the road is constructed. An annual tournament may take place on the Atlantic-Pablo beach."

Mr. Morgan has gone to Galveston, Tex., to meet the Galveston Automobile and Business Men's League, inspect the beach at that place, and talk over the possibilities of a race meet next year.

OLDFIELD DID NOT BREAK TRACK RECORD.

Barney Oldfield's mile in :51 4-5, made recently on the Lakeside track near San Diego, Cal., was accomplished on a two-mile circuit, thereby placing it in the same class with Webb Jay's White steamer mile of :48 4-5, made at the Morris Park track, New York City, July 4, 1905. It will be remembered that the Morris Park track was 1.39 miles, the starting point for the mile being on the backstretch, and thus making only one turn necessary in reaching the finish wire. The Lakeside track is specially constructed for automobilism, and Oldfield believes that he will be able to drive his Peerless Green Dragon a mile in :46. The one-mile circular track record still remains at :53, held jointly by Oldfield and Walter Christie, the former having made his mark at Los Angeles, Cal., and the latter on the Empire City track, Yonkers, N. Y.

FIAT AMONG LATE ENTRANTS FOR GRAND PRIX

PARIS, April 22.—When Walter Christie cabled at the eleventh hour the entry of his front-drive car in the Grand Prix, the automobile world was convinced that no further entry fee would pass into the hands of the Sporting Commission. Automobile firms are human and are no more given to paying two thousand dollars where one thousand will do than the rest of us. There was thus a commotion in the upper room, where the business in connection with the Grand Prix is transacted, when, a few hours before the final closing of engagements at double fees, Emile Lamberjack walked in with a check for six thousand dollars as entry fee for three Fiat racers. A couple of months ago a formal declaration went forth from the Italian factories that neither Fiat nor Itala would participate in the French annual race. No reason was given, though it was generally rumored that there was dissatisfaction with the new conditions. France was disappointed, for the abstention of two of her most formidable rivals robbed the race of much of its interest. Emile Lamberjack was still more disappointed, for he looked upon the abstention as an acknowledgment of defeat. After a little hesitation he resolved on a bold course. At his own expense he ordered three racers to be built, commanded absolute secrecy, and at the last moment walked into the Automobile Club of France and paid over the double entry fee. The engagement has caused a sensation and created satisfaction all round, for such an entry adds considerably to the interest of the race.

But Fiat is not the only late comer. At 6 o'clock, within a few minutes of the closing of the books, Gustave Gobron crossed over the Place de la Concorde, mounted to the first floor of the club and handed to Secretary Sautin an engagement for one Gobron machine and a check for two thousand dollars in due and proper form. Within an hour the Grand Prix fees had mounted from \$34,000 to \$42,000, and the list of entries had gone up from 34 to 38. Although causing less sensation, the Gobron entry was as great a surprise as that of Fiat. Lancia, Nazzaro and Weilschott will, as last year, be in charge of the Fiat racers. The final list for the Grand Prix, no further additions now being possible, is as follows:

France, 24 machines, consisting of 3 Bayard-Clément, 3 Darracq, 3 Motobloc, 1 Corre, 3 Panhard-Levassor, 3 Renault Frères, 3 Lorraine-Dietrich, 1 Porthos, 3 Brasier, 1 Gobron.

Germany, 3 Mercedes.

Italy, 5 machines, consisting of 1 Marchand, 1 Aquila Italiana, 3 Fiat.

Belgium, 3 Germain.

England, 2 Weigel.

America, 1 Christie.

Forty-seven machines will rush round the Dieppe course on July 2, for in addition to the 38 Grand Prix racers there are nine smaller racers engaged in the Sporting Commission cup, seven of them being French and two Italian. Only three firms have entered for the tire competition run in connection with the race, but five other tire firms have engaged stands on the course, without taking any part in the competition. To distinguish between those tires taking part in the competition and those which are not, the former will be painted a bright yellow.

Lancia, Now Lucky, Will Set the Pace.

The wheel of fortune has at last favored Lancia. When lots were drawn to-day at the A. C. F. for starting positions in the race it was Lancia, the man whose engagement was sent in at the last possible moment, who was given number one, and with it the right to rush round the Dieppe circuit at 6 A. M. on the morning of July 2 with no one to hinder him or to stay his wild course. Number one is always looked upon as a position of honor, and there is no doubt that Lancia will take full advantage to be derived from a clear course on the initial round. D'Hespel,

on a Corre, takes second place, starting one minute after Lancia, and at 6.2 Wagner, the Vanderbilt champion, will rush over the line on his little Darracq, bearing number 3, which last year was carried to victory by Sisiz on a Renault. This year Sisiz starts ninth. Walter Christie has drawn twelfth position, and just behind him will be dare-devil Jenatzky with 13, of doubtful omen. Brasier has fared badly in the drawing, for his first machine starts seventeenth and his third one closes the procession.

An Original System of Numbering the Racers.

A new system of numbering the cars has been adopted this year. The cars are given a team letter and numbered one, two, or three according to the position they occupy on the starting list. Thus the Fiat team letter is F, and Lancia, the first starter, takes F 1. Darracq team letter is D, Wagner carrying D 1, Hanriot D 2, and Demogeot D 3. Walter Christie carries W C 1. There are thus seventeen machines with a team letter or combination of letters and number 1, eleven with figure 2, and ten with figure 3. This method of numbering has met with some criticism on the ground that it does not indicate the order in which the machines started. George Prade, the iconoclast editor, declares that it is a ridiculous arrangement, and that the only sensible plan would have been to number the machines from 1 to 38 and give a distinctive color or combination of colors for each team.

The following is the order of starting in the Grand Prix, the first machine being sent away at 6 A. M., the others leaving at intervals of one minute:

- | | |
|--------------------------------|--------------------------------|
| 1. Fiat, LanciaF 1 | 19. Darracq, Hanriot.....D 2 |
| 2. Corre, d'HespelC 1 | 20. Dietrich, Rougier.....L 2 |
| 3. Darracq, Wagner.....D 1 | 21. Bayard-Clément, |
| 4. Dietrich, Duray.....L 1 | GarcetBC 2 |
| 5. Porthos, Stricker.....P 1 | 22. MotoblocMB 2 |
| 6. Dufaux-Marchand, | 23. Renault, Edmond.....R 2 |
| F. DufauxDM 1 | 24. Germain, DegraisGE 2 |
| 7. Bayard-Clément, | 25. Panhard, HeathPL 2 |
| Albert ClémentBC 1 | 26. Mercedes, Werner.....M 2 |
| 8. MotoblocMB 1 | 27. Weigel, Weigel.....W 2 |
| 9. Renault, SisizR 1 | 28. Brasier, BarasB 2 |
| 10. Germain, Perpère.....GE 1 | 29. Fiat, Weilschott.....F 3 |
| 11. Panhard, Le Blon....PL 1 | 30. Darracq, Demogeot....D 3 |
| 12. Christie, | 31. Dietrich, GabrielL 3 |
| Walter Christie....WC 1 | 32. Bayard-Clément |
| 13. Mercedes, JenatzkyM 1 | GaudermanBC 3 |
| 14. Weigel, Lee Guinness..W 1 | 33. MotoblocMB 3 |
| 15. GobronGB 1 | 34. Renault, RichezR 3 |
| 16. Aquila Italiana, | 35. Germain, Roch Brault..GE 3 |
| RichatA 1 | 36. Panhard, Dutemple...PL 3 |
| 17. Brasier, Barillier.....B 1 | 37. Mercedes, Willy Poege..M 3 |
| 18. Fiat, Nazzaro.....F 2 | 38. Brasier, Bablot.....B 3 |

Starts will be made on the loop track, and not on the main course, the seventeen machines bearing number one being brought out at once and drawn up in Indian file, the second series with number two coming out later, and finally the third series. By this means the main track will be perfectly free. The racers engaged in the Sporting Commission Cup will be started two or three hours later, at intervals yet to be decided upon and in the following order:

- | |
|--|
| 1. Gillet-Forest, De la Touloubre.....GF 1 |
| 2. Darracq, CalloisD 1 |
| 3. H. I. S. A., Moulin.....H 1 |
| 4. La Buire, P. Dumaine.....LB 1 |
| 5. PorthosP 1 |
| 6. DarracqD 2 |
| 7. H. I. S. A., Baron de Caters.....H 2 |
| 8. La Buire, Mottard.....LB 2 |
| 9. La Buire, DessaigneLB 3 |

Official numbers must be immediately painted on the machines in either black on white or white on black. Elaborate precautions are being made to prevent violation of the rules. The night before the race the machines will be given their allowance of gasoline, the tank being filled and the surplus put into cans and

sealed. Each machine will be locked in a separate box and guarded all night by a commissaire. If the driver expresses a desire for a small quantity of gasoline to start the motor a quarter of a liter will be drawn from the tank and given to him separately. There will be a separate tire and gasoline station for each machine, and not for each firm, as last year, everything allowed by the rules being obtainable at the grand stand stations, and tires only at the second station, half way round the course. Eighty inspectors, or more than one per kilometer, will be stationed round the course to observe that no aid is given to the machines, and especially that they do not obtain gasoline from outside sources. As last year, all work on the racers, from the moment the start is given to the time when the contest is called off, must be performed by the driver and his mechanic only. At the second tire station the tires will be hung up on the outside of the barricade separating the stations from the course. Drivers will hastily grab new tires as they slow down for a second, throwing the old ones over the barrier.

Official measurement of the course shows that the total distance round is 47.8 miles; ten rounds will be covered in the Grand Prix, giving a total distance of 478.3 miles. Sporting Commission Cup racers will only cover six rounds, giving a total of 287 miles.

Britain's King May Go to the Races.

Hopes are high of King Edward witnessing the Grand Prix. Rumors have been afloat for some time that the King of England had considered the question and that a favorable decision was likely. Last week the sub-prefect of Dieppe and the mayor of the town left for London to use their influence in obtaining the presence of the British sovereign at the race and at the same time to make arrangements for the motor boat race across the channel from Newhaven to Dieppe, to be held in conjunction with the Grand Prix. Natives of the district are dissatisfied with the decision of the Automobile Club of France to open a large camping ground in the vicinity of the course, and declare that if this intention is persisted in they will withhold their subscriptions to the club. As the Dieppe district is contributing \$20,000 to the funds of the A. C. F., this body is obliged to pay some attention to the wishes of the inhabitants. Nothing has yet been officially announced regarding their reply to the anti-campers.

CHRISTIE RACER IS BEING TRIED OUT.

Walter Christie's Grand Prix racer made its first run on a quiet road near the factory this week. Excepting a leaky radiator, and a few details of little importance the test was most satisfactory, the machine showing remarkable speed and giving all that was expected of her from her builder. Walter Christie declares that a few slight alterations will be made and that the end of this week he will leave New York for a fortnight's thorough testing. It has been decided to use Diamond tires.

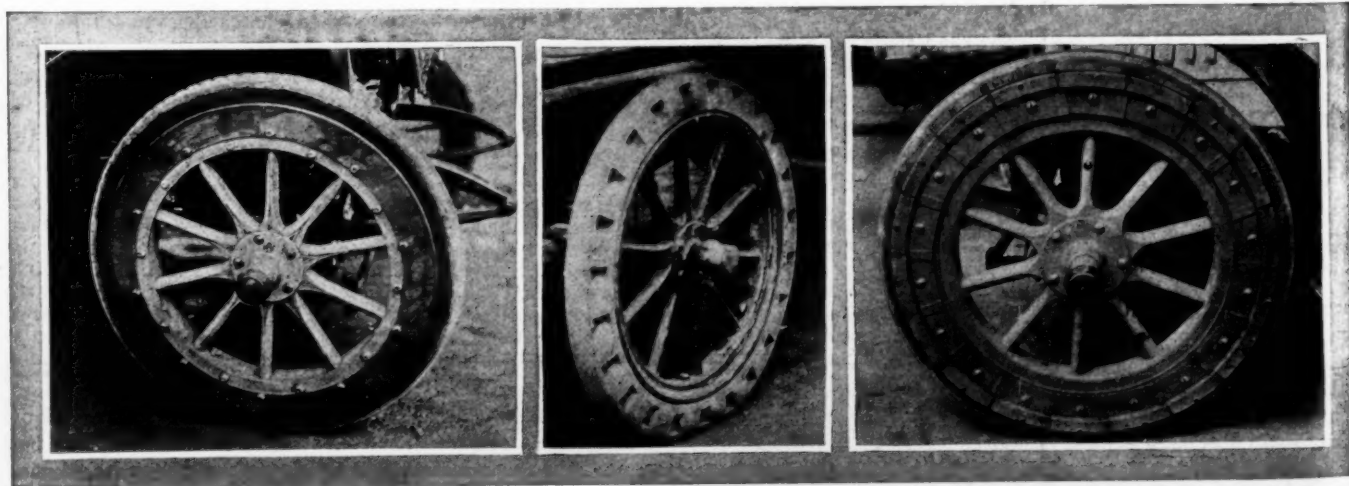
FRENCH SPRING WHEEL TEST.

PARIS, April 23.—There appears to be more interest on the part of the automobile public in the spring wheel problem than among wheel makers and inventors. Last year, when an exhibition and competition was organized in Paris for any type of wheel other than pneumatic, eleven machines were assembled, and three fulfilled all the demands of the test. This year there are thirteen starters, employing seven different systems, a smaller number than in the previous contest, only three of them being of recent origin. The test consists of a run from Paris to Marseilles and back, in four outward and four homeward stages, at an average speed of forty kilometers an hour. Repairs may be done on the wheels if necessary, but as there is an ever-watchful commissioner from a rival firm on board, who is enjoined to make a careful note of such attentions and report them to the jury appointed to examine the wheels on their return to the capital, drivers keep their fingers off as much as possible. The total distance to Marseilles and back is 1,300 miles, giving a daily average of 150 miles.

The competitors consisted of one Soleil, three Ducasble, three Elastes, two Edmond Levi, one Securitas, one Cosset, and one Sider. Securitas, Ducasble, Cosset and Elastes are, if not entirely new, at least newcomers in competitions of this nature. Elastes has come into general use during the past year, more especially on horse and gasoline cabs. Externally, the wheel does not differ from the ordinary type of pneumatic tire. Instead of being filled with air, however, there is an inner tube of rubbery composition made largely of glue, glycerine and chromatic salts. The outer shoe is forced on over this ring of composition. On the Securitas wheel a number of rubber balls of varying diameter and resistance, according to the nature of the car on which it will be used, are placed between the felloe and the outer rim. These balls are lodged in a chamber formed by the rim of the wheel, two steel beads solidly attached to the rim, and a strong steel collar holding the rubber bandage coming in contact with the road. This outer steel rim is of I-section, the two projections fitting into grooves on the felloe, and having a sliding movement. The rubber balls between the two give the necessary resiliency. There is a special arrangement to prevent the outer rim revolving on the inner, though not of a nature to prevent it being compressed.

Ducasble is a cushion tire with a number of independent air chambers, each of which has an air hole, out of which the air is forced when that part of the tire is compressed, and through which fresh air is drawn when pressure is released.

The Sider wheel consists of a shoe similar in external appearance to an ordinary pneumatic shoe, with a number of thin steel bands placed transversely to the rim, superimposed, but separated by layers of canvas. It forms a semi-metallic tissue, the springs forming the web and being united by a chain.



SECURITAS SPRING WHEEL.

THE DUCASBLE.

INVENTOR COSSET'S WHEEL.

MASSACHUSETTS REGISTRATIONS.

BOSTON, April 29.—Automobile registration in Massachusetts has shown a steady gain this spring, and for the first four months of the current year the registration with the highway commissioners is more than 300 cars ahead of the same months last year. Since the first of January there have been registered approximately 2,100 machines, against 1719 for the first four months of 1906. The number of licenses to operate, however, have not increased proportionately, indicating that not as many new owners are registered as last year. Since the first of last January there have been issued 824 ordinary operators' licenses, against 956 for the first four months of last year, and the registration of motorcycles remains about the same. There have been only 27 new manufacturers and dealers registered so far this year, against 58 for the corresponding time a year ago.

No Board of Examiners in Massachusetts.

The Committee on Roads and Bridges of the Legislature this week reported unfavorably on the recommendations of Governor Guild in his inaugural address. These were that a board of expert examiners be established to pass upon the applications of chauffeurs for licenses, and that a statute be passed giving pedestrians and horse-drawn vehicles the right of way over automobiles on the highways of the State. The report on both these recommendations was, "no legislation necessary." The highway commission already has sufficient power, if it wishes, to put applicants for chauffeurs' licenses through any sort of a reasonable test it may devise.

An Annual Registration, but Amount Undetermined.

The only legislative matter that is still unsettled is the bill to increase the fee for registration. As originally proposed this bill provided for a sliding scale of fees from \$5 to \$15 for pleasure cars based on horsepower. That feature of the bill, it is said, has been abandoned by the committee, and it has practically been decided to report a measure providing for a flat annual registration fee, the same for all sorts of pleasure motor vehicles. What the sum will be has not been settled, but it is stated that a majority of the committee favors a \$5 annual fee. This would provide approximately \$60,000, which is \$10,000 more than the amount which the highway commission estimates is necessary to make repairs on the highways of damage caused by automobiles.

WHAT'S DOING IN AUTO LEGISLATION.

MADISON, WIS., April 29.—All automobile bills have been practically killed. James T. Drought, of the Milwaukee Automobile Club, was exceedingly active in heading off unfavorable legislation and deserves great credit for his efforts.

ST. PAUL, MINN., April 29.—The State Senate has passed Senator Nelson's automobile bill after amending it so as to make the maximum speed in cities 15 miles per hour instead of 8.

LANSING, MICH., April 29.—The Secretary of State's office wants to inaugurate a new system of registering automobiles, compelling a comprehensive certificate to be issued for each machine, the original to cost \$5 and \$2.50 for a yearly renewal. There is also a provision for registering chauffeurs annually and providing them with badges at no additional cost, but their competency must be vouched for by two reliable persons.

PENNSYLVANIA REFUSES TO BE PROGRESSIVE.

PHILADELPHIA, April 29.—The Pennsylvania Constitution will not be amended in the interest of good roads. The bill to borrow \$25,000,000 to be devoted to the improvement of the roads of the State fell by the wayside last Wednesday when, by a vote of 91 yeas to 68 nays, it failed by reason of the two-thirds provision required for the passage of Constitutional amendments. The facts that the State has a big balance in the treasury and that several millions "graft" was gathered in on the new capitol without materially flattening the Commonwealth's pocketbook, were responsible for the failure.

BOSTON FIRE CHIEF'S STEAMER.

BOSTON, April 29.—Another important addition to the automobile corps of the Boston fire department is the steam car designed by Louis S. Ross and built in his factory at Newtonville, especially for the use of Chief Mullen of the department. Ross, besides being one of the best-known drivers of steam cars in the world, is also a fire crank, and for some time he has been endeavoring to construct an automobile for fire work. He finally interested Commissioner Wells, of the Boston department, and secured the order. The car in general appearance is a tourer, but it cost to build considerable more than Ross charges for his stock tourer, and in every part has been designed for fast and hard work. The frame, axles, springs and driving parts are all heavier than in the ordinary car, and the boiler, of the fire tube pattern, is 26 inches in diameter, while the two-cylinder vertical engine, it is claimed, will generate 75 horsepower and give a speed of 50 miles an hour. Such a speed has already been attained in trial runs and the car has climbed Parker hill, the worst grade in the city.

To protect the car from damage there is a bumper in front, and the car is equipped throughout with Kilgore shock absorbers. In the rear is a patent leather trunk in which are carried the coats of the chief and his aide, Lieutenant Webber, who has charge of



ROSS STEAM CAR BUILT FOR BOSTON FIRE CHIEF.

Chief Mullen in uniform and Fire Commissioner Wells in the rear seat; Lieutenant Webber, aid to the chief, and Charles Cosgrove in front seat.

the car. Under the rear seat are special compartments for the fire hats and rubber boots of the occupants of the machine. A speedometer, water, gasoline, air and steam gauges are placed on the dash, where there is also a special cut-out so that when the car is left alone at a fire it cannot be harmed by anyone who attempts to meddle with the machinery.

Both boiler and engine are carried under the hood, and Mr. Ross has exercised his ingenuity to a remarkable degree in providing arrangements by which every sort of a breakdown can be avoided. He has an arrangement, for instance, by which if the superheater is damaged wet steam can be used and every part is so made as to be quickly interchangeable. Under the front seat is a 40-gallon water tank, while in the rear is a 30-gallon gasoline tank. The air pressure is maintained mechanically and there is also an auxiliary air tank so that there is never danger of trouble from lack of air pressure. When the car is not in use the steam pressure is maintained by the pilot light, which always keeps up a sufficient head of steam to start the car at 25 miles an hour, and it is claimed by Lieutenant Webber that while the chief is getting on his coat he can have the car ready for a dash to the furthestmost section of the city at highest speed. The pilot light costs about 15 cents a day in gasoline.

A garage and repair shop has been opened at Brattleboro, Vt., by the E. R. Clark Automobile Company, of Springfield, Mass. The equipment is modern and complete.

A MERGER INVOLVING TIRE INDUSTRY.

There is a possibility of the affiliation of the United States Rubber Company with the Continental Rubber Company, which, if brought about, will unite the largest manufacturing and the largest rubber controlling bodies in one corporation.

Inquiries at the headquarters of the United States Rubber Company were met with the information that the merger was under consideration, and that an examination of the affairs of the numerous bodies affiliated with or controlled by the United States Rubber Company was being carried out. No definite action has yet been taken, and it is not likely that any definite move will be made for several months.

The amalgamation is of interest to the automobile industry from the fact that the United States Rubber Company controls some of the most important tire manufacturing concerns in this country.

The Continental Rubber Company holds the largest concessions of raw material in the world, some of which, in Mexico and on the Congo, have never been exploited. "Should the amalgamation be consummated, it will result in a reduction in the price of manufactured goods," declared the official of the United States Rubber Company.

A Rubber Affiliation Just Announced.

INDIANAPOLIS, April 29.—Charles H. Dale, president of the Rubber Goods Manufacturing Company, makes the first official announcement in his annual report of the affiliation between the Rubber Goods Manufacturing Company and the United States Rubber Company, which it is understood was brought about a few months ago.

The Rubber Goods Manufacturing Company is an organization of several manufacturers of rubber tires, including the G & J plant in this city, while the United States Rubber Company is composed of manufacturers of rubber boots and similar articles. It is said in the report that the affiliation of the two associations has resulted in considerable good to each, including better facilities for the purchase of crude material.

NASHVILLE, TENN., TRIES THE SHOW IDEA.

NASHVILLE, TENN., April 27.—A decisive impetus was given to automobile interests in Nashville this week, when, in connection with and as a feature of the Spring Festival, under the auspices of the Board of Trade, the automobile dealers and manufacturers' agents arranged an exhibit of cars. The garage of the Southern Automobile Agency was selected, and many examined the eleven makes of cars shown. The garage was beautified with palms and flowers.

A car that attracted much attention was the White steamer eight-passenger limousine. This car is the only one of its kind in the State, and was sold to W. J. Oliver, Knoxville, who will be remembered as the lowest bidder on the Panama Canal contract. Another car that called for admiration was the Dorris car, built by Preston Dorris, an old Nashville boy. Duncan R. Dorris, a brother of Preston Dorris, and manager of the Nashville Motor Car Company, himself personally demonstrated this car.

AN AUTOMOBILE SHOW IN DARKEST RUSSIA.

It seems that 1907 will go down into history as the year in which every country but Liberia and the Congo Free State held an automobile show. Spain makes her debut in this field this month, and now Russia has vitalized a project to do likewise. Consul-General Watts, at St. Petersburg, forwards a letter to the department from the chairman of the executive committee of the Automobile Club of Russia, requesting him to make known in the United States the regulations of the first international motor-car exhibition, to be held from June 1 to 17 under its auspices. The Russian Government has already granted special railway rates for all exhibits. The complete regulations, printed in French, are on file at the Bureau of Manufactures, where they are available to the trade.

FIRST AMERICAN AEROPLANE CONTEST.

Rules governing the competition for the *Scientific American* flying machine trophy, drawn up by a special committee of the Aero Club of America, stipulate that the competition shall be open to all nations, that it shall be held annually, and that the first contest shall be at the Jamestown exhibition on September 14, 1907. Entries are received at the Aero Club of America prior to September 1. Heavier-than-air machines of any type whatever are eligible for the competition, the trophy going to the one covering a distance of one kilometer in the shortest time and with the best display of stability and ease of control. The flights shall be made in calm air if possible, the start being made against the wind. If the trophy is won by the representative of a foreign aeronautical club, this club may become the custodian of the trophy, but all competitions, even if held abroad, must be carried out under the rules used by the Aero Club of America in the competition held here.

M. CHARRON WEDS CLÉMENTS DAUGHTER.

PARIS, April 22.—It was a strictly automobile gathering that assembled at the *mairie* of Neuilly-sur-Seine to celebrate the marriage of Ferdinand Charron, winner in the first Gordon Bennett Cup contest and the head of the firm of C. G. V., with Mademoiselle Jeanne Clément, daughter of M. Clément, founder of the Bayard-Clément firm. Ferdinand Charron, in addition to being one of the most important business men in the Paris automobile world, is an all-round sportsman, has been successful in bicycle and automobile contests, and lately has ridden his own horses to victory in races at Longchamps against the most experienced European jockeys. The brilliant ceremony was attended by representatives from nearly all the important French automobile firms, among the guests being Marquis de Dion, Louis Renault, René de Knyff and Dominique Lamberjack. The entire wedding party arrived in C. G. V. and Bayard-Clément automobiles.

NO HOPE FOR ITALY IN THE AERO CUP RACE.

PARIS, April 23.—All hope of Italian participation in the Gordon Bennett balloon contest at St. Louis on October 19 is at an end as the result of a recent decision of the International Aeronautical Federation. It will be remembered that Italy sent in an entry for the race several weeks after the official date of closing, and that their engagement was refused. A special appeal was made to the International Federation, which is alone authorized to judge in such a matter, on the ground that unforeseen circumstances had prevented the entry being sent in according to regulations. After due consideration the Federation declared that they regretted that they were obliged to apply the rules rigorously, and must in consequence refuse the Italian entry.

LIEUTENANT LAHM ILL WITH TYPHOID.

According to despatches from France, Lieutenant Frank P. Lahm, who is undergoing a course of special training at the French military cavalry school at Saumur, is ill with typhoid fever. Lieutenant Lahm was selected, with J. C. McCoy and Alan R. Hawley, to represent the United States in the balloon race for the Bennett Cup from St. Louis next October. Should he not be able to take part in this contest as the result of the illness, his place will be taken by one of the three substitutes yet to be named by the Aero Club of America.

AN AIRSHIP WHICH CARRIES TEN.

A cable despatch from Paris announces that a giant aerostat named the *Eagle*, with a capacity of 4,150 cubic meters, made a successful ascent from the grounds of the Aero Club at Saint-Cloud. There were ten of the best aeronauts of Paris in the car, among them being Santos-Dumont. The balloon vanished to the southwest before a fair breeze. M. Bihan, vice-president of the Aero Club of France, is the owner of the *Eagle*.

FRANKLIN MOTOR HAS INDOOR TEST.

Just to demonstrate that the Franklin air-cooled motor was everything that its name would indicate, the New York City agents, Wyckoff, Church & Partridge, mounted a complete 12-horsepower Franklin car on stilts at their establishment at Fifty-sixth street and Broadway last week and set it going in the presence of a number of technical men and newspaper representatives. It was started at 3 P.M. Wednesday afternoon by E. L. Ferguson, chairman of the technical committee of the New York Motor Club, who thereupon sealed the carbureter and ignition adjustments so that they could not be tampered with in any way, thus making the test particularly severe as the motor could not be "nursed" in any way to keep it going. The sealing was attested to by a committee composed of Mr. Ferguson, Sam Butler of the Automobile Club of America, and Alex Schwalbach of the Long Island Automobile Club. The observation committee consisted of Al Reeves, manager of the A. M. C. M. A., Fred Wagner and D. A. Ward. The motor was run at 400 r. p. m.—an equivalent of 9 miles an hour—without a fan and in the closed salesroom, thus depriving it of the most efficient of cooling factors, convection. It continued to run for 44 hours, which was equivalent to 540 miles, without other attention than a supply of gasoline and oil, at the end of which period it was stopped purposely. Wyckoff, Church & Partridge tried the Franklin motor beforehand, and had had it running steadily night and day since the previous Friday. It was simply stopped for a short time on Wednesday to go through the formality of sealing, so that when it was finally stopped it had been running a whole week in a closed room—something that speaks well for the Franklin auxiliary exhaust, which made the feat possible. The exhaust gases were piped out of the room.



A VISIT TO BATTLE MONUMENT, WEST POINT, IN A PEERLESS.

[The monument is erected to the memory of officers of the United States Army, who have been killed in the service. Battle Mountain is in the background.]

EXPORTS BEGIN TO DOUBLE ANNUALLY.

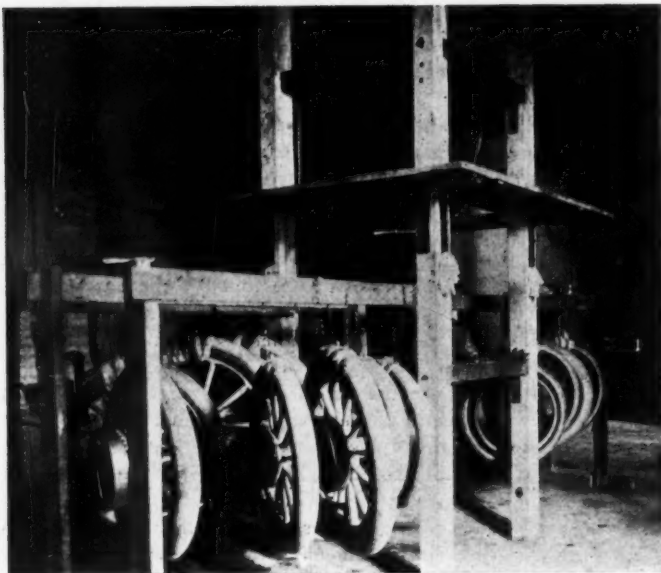
While it is to be regretted that no statistics of automobile production are kept in this country, some idea of the rate at which the annual output is increasing may be had from the export returns. For the month of March, 1907, the total was \$545,347, representing an increase of more than \$250,000 over the same month of but a year ago, when the total was \$293,561. This sum is composed of the value of 307 complete cars, reaching a total of \$493,425, and parts to the extent of \$51,922. And the most striking feature of the report is to be found in the fact that a very large part of the increase is to be found in the returns from automobile-producing countries. The amount sent to Great Britain, for instance, more than doubled in that time, increasing from \$70,414 for March, 1906, to \$146,621 in the present year, while to France it more than trebled, the figures being \$16,035 and \$65,813; to Germany the increase amounted to but \$3,000 in round numbers, though to other Europe there was a jump from \$12,207 to \$59,573. Mexico, British North America and South America also show substantial increases.

During the period of nine months ending with March for three years past the increasing totals tell a similar story. For 1905 this was \$1,638,601; 1906, \$2,064,874, and 1907, \$3,418,593, the last-named total being composed of the value of 1,889 complete cars amounting to \$2,965,284 and \$453,309 worth of parts. The report in detail, showing the increase in March, 1907, as compared with 1906, and for the eight months ending with March in those two years follows. Prior to July, 1905, automobile exports were not considered of sufficient moment to state in detail.

	March 1906	March 1907	Nine Mos. 1906	Ending Mar. 1907
Automobiles, and parts of:				
Automobiles. No. 307...	\$293,561	\$493,425	\$2,064,874	\$2,965,284
Parts of		51,922		453,309
Exported to:				
United Kingdom	\$70,414	\$146,621	\$541,431	\$809,644
France	16,035	65,813	139,226	277,418
Germany	10,413	13,701	45,742	85,508
Italy	40,418	27,024	171,628	126,127
Other Europe	12,207	59,573	102,459	166,260
British North America	69,094	124,524	353,717	695,884
Mexico	34,611	66,908	201,121	628,243
W. Indies and Bermuda	9,996	13,391	220,424	171,800
South America	3,991	21,415	52,032	169,056
British East Indies....	369	4,758	28,733	26,083
British Australasia....	10,774	1,265	129,620	185,943
Other Asia and Oceania	9,857	236	40,767	69,712
Africa	5,219	118	26,094	8,673
Other countries	163	...	11,880	8,242
Total automobiles, and parts of.....	\$293,561	\$545,347	\$2,064,874	\$3,418,593

EZRA KIRK.

Ezra E. Kirk, sales manager of the E. R. Thomas Motor Company, Buffalo, N. Y., for the past year and more, has resigned, and his address is now 915 Jefferson avenue, Toledo, O. Mr. Kirk is one of the pioneers of cycling who took to automobiling at its inception and is well known throughout the trade. His plans for the future he is not as yet prepared to announce, but his continuance in the trade is a certainty.



NEWMASTIC WORKSHOP, WITH DEVICE FOR FILLING TIRES.

A SUBSTITUTE FOR AIR IN TIRES.

Substitutes for pneumatic tires have so frequently been introduced that the practical automobilist has ceased to prick up his ears when a new one is brought forth with beating of drums. Some months ago a spongy preparation for filling ordinary pneumatic tires was put on the French market and is at present being used with considerable success, more especially on horse and gasoline cabs. Avoiding details, it consists of a composition composed of glue, glycerine, and chromatic salts, liquefied, poured into the tire and allowed to set. The composition can be made as spongy or as hard as desired, and providing it does not lose its resiliency with use, forms what is claimed to be an excellent substitute for air-filled tires. We have not been able to watch the performance of the French product for long periods, but the extent to which it is being adopted for public vehicles in European capitals would seem to indicate that it satisfies.

It was somewhat of a surprise to discover that a substitute for the pneumatic tire, similar in principle, but improved in detail, to the article employed in Europe, had been manufactured in this country for over four years, considerably antedating the French rival. C. D. Nirdlinger had the honor of inventing a preparation for use in tires, to which he gave the title of Newmastic. For several years he worked in a quiet way, filling tires that were sent to him, established a couple of branches in distant cities, but failed to make his product known outside of a limited circle.

Only a few months ago Nirdlinger's patents were brought to the notice of interested capitalists, and immediately arrangements were made for lifting them out of the rut in which they had for so long been held.

In a store at Sixty-eighth street and Broadway, the Newmastic Tire Company has established its New York headquarters, and it is there that ordinary pneumatic tires for lordly touring machines and humble bikes are transformed from air-filled to Newmastic-filled. On the occasion of the visit of the representative of *THE AUTOMOBILE*, a group of workmen, with the inventor at their head, were just about to operate upon a batch of tires of all sizes and conditions. On a raised platform was a large copper-jacketed vat with a circular gas jet beneath it, in which for several hours a mixture of glue, glycerine and chromatic salts had been gently simmering, all the time stirred up by a revolving paddle within the vat. A glance at the illustration will show the arrangement of the vat.

Two men bearing a can of chemicals in solution mounted a ladder to the upper platform, poured the contents into the vat, and descended. A minute later the paddle was stopped, and a cock opened at the base of the vat, allowing the hot composition

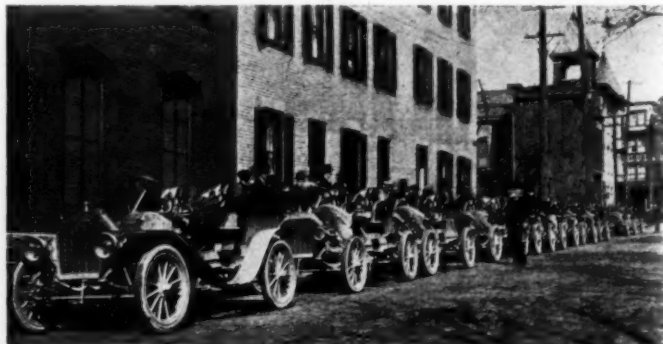
to run out into another tank immediately beneath. From the lower tank a central outlet pipe runs with a number of branch arms, each one fitted with a tap. Over the piping were suspended a number of automobile wheels, fitted with pneumatic tires. They were a motley group; the smallest was for a bicycle, the largest for a big Panhard touring machine. Each one had had its valve drilled out, and was connected up to an arm of the main outlet pipe at the base of tank. A couple of needle valves had been pushed into each tire and were held there by a sleeve. On a given signal the flow of the hot composition was stopped, the inlet closed hermetically and compressed air allowed to enter the lower vat from a huge tank on an elevated platform. A few seconds later air could be heard hissing out of the valves pierced through the tires, and immediately after the grey composition began to issue. A half turn of the needle and the valves were closed, and each man stood with his fingers on the tire awaiting the moment when experience told him that it was necessary to shut off the supply. All that then remained to be done was to disconnect the tire valve from the pipe, take the wheel down, pull out the air plugs, which, being no thicker than a fine pricker, left a hole of no importance, clean off any of the composition which had oozed out about the inlet valve, fix the wheel on the car and go on the way rejoicing.

One of the qualities of this composition is that it sets almost instantly into a springy, rubbery mass, so that there is no delay in changing from air-filled tires to those provided with Newmastic. It is claimed that the composition will not harden with use; that, indeed, its tendency is to get slightly softer as it increases in age. Experiments with the hot flame of a soldering lamp proved conclusively that it could not be melted with heat. A section was placed in the flame for a few seconds; it frizzled, but would not melt, and apparently lost none of its resiliency by the application of the heat.

The first objection made to the preparation would be that of weight. If it were used on a light motorcycle the objection would hold. But if applied to a medium weight touring car or runabout there would be no increase, while if it were a very heavy and powerful machine a gain in weight would be made. Generally the weight of the resilient composition put into the tires is equal to the extra shoe, jack, inner tubes and repair outfit carried on the machine. Weight is taken off the machine and put on the wheels in an ordinary case; there is a distinct saving on the heaviest types of automobiles.

TRYING OUT THE POPE-TRIBUNE RUNABOUT.

CUMBERLAND, Md., April 27.—The hills of Maryland supply excellent trying out territory, and the Pope Manufacturing Company's plant at Hagerstown therefore has an ideal location. H. L. Pope, its general manager; V. M. Palmer, the superintendent, and eighteen others of the Pope staff came to Cumberland with ten 16-20-horsepower Pope-Tribune four-cylinder runabouts recently on a testing trip. At Sideling Hill it was necessary to ford the creek with the water up to the hubs of the cars. The party stopped over night in Cumberland.



POPE-TRIBUNE CAR TESTING PARTY AT CUMBERLAND, MD.

REO SUBMARINE MAKES DEEP SEA RECORD.

When sending a car off on a record-making or breaking trip on the Pacific Coast, there are more things to be thought of than gasoline, oil, tires and spares—many more—and not the least of them is the fact that, owing to the lamentable lack of bridges

**H. M. HANSHUE IN HIS REO.**

and other signs of civilization, there are apt to be many times when the car will find itself under water. Now the modern automobile, while amphibious to a certain extent, is not a diver, and when the wet begins to rise above the footboards there is usually a muffled sigh and a gurgle that sounds the death knell of the carbureter as well as the ignition system.

But he of the alliterative cognomen—Harris Hanshue—took this into account when he assayed to do things to the Oakland-Los Angeles record in a Reo. On that stretch of 500 miles there is plenty of water, and lots of it pretty deep at that. He turned his car over to the mercies of L. T. Shettler before starting, and the latter used some garden hose with good effect; in other words, he brought the carbureter air intake and the exhaust above "sea level," as shown by the protuberance sticking above the car in the accompanying photographs of the exploit. In addition, every part of the car susceptible to moisture was wrapped with tape, shellacked and then wrapped again. As a result, the 500 miles of mud, roughness and deep fords were made in two days and fifty-four minutes, every foot of it being covered by the little Reo under its own power, which is more than a mere record for a two-cylinder car. The time really gives no idea of the pace at which obstacles were overcome, for some seven hours were lost at Tulare by making a roundabout circuit on the wrong road and re-entering the same town that much later. Failure of the acetylene gas at Livermore accounted for more lost time, as in addition to darkness there was also fog.

**EXHAUST CARRIED ABOVE SEAT BACKS.****CORLEW MAY HEAD NEW ENGLAND CONCERN.**

BOSTON, MASS., April 29.—It is rumored that Frank S. Corlew, who organized the Dragon Automobile Company, of Philadelphia, and who lately resigned his position as vice-president and sales manager, has been approached by New England capitalists to head a proposed automobile industry, which, it is understood, will be one of the largest automobile companies in the United States. It is said to be their intention not only to build low-priced pleasure vehicles, but taximeter cabs and light delivery wagons, and the factory to be located in or near Boston. Full details and announcement of the proposed industry is expected to be given out in a short time.

The city hall commission of Newark, N. J., has decided to erect a garage in the rear of the city hall, which will measure 56x96 feet, and be two stories high.

A. M. C. M. A. SECURES REDUCTION IN RATES.

By an extremely illogical interpretation of a rule established by the Pennsylvania ferries before the advent of the automobile, a loaded five-ton truck was ferried for a charge of 90 cents, but one carrying machinery had to pay \$4 a trip. The gasoline-driven commercial vehicle contained machinery, *ergo* it had to pay the four-dollar rate over that ferry. In construing the rule, the officials never considered whether it meant machinery in or on the truck, and stretched it to cover both. The reason for charging more in the case of a truck loaded with machinery was due to the fact that very heavy pieces were frequently thus carried, and occasioned trouble and delay by being unable to leave at the other end owing to the grade of the bridge at low-tide.

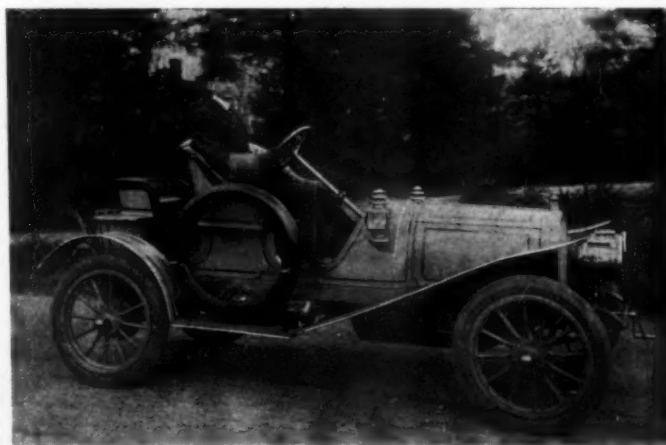
As this was an unjust discrimination against the users of commercial vehicles, the freight committee of the American Motor Car Manufacturers' Association, working in conjunction with J. H. Wood, general manager of the Merchants' Express and Transportation Company, took up the matter with the Pennsylvania Railroad officials, and has succeeded in having the tariff reduced to 38 cents a trip, or, when bought in hundred lots, 30 cents a trip, as obtains on other ferries. When loaded with machinery the usual additional charge will be made.

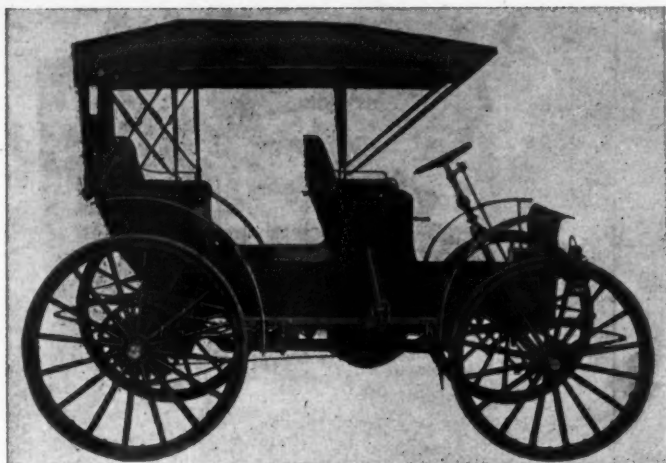
GIVING INVENTIVE GENIUS ITS JUST DUE.

In the article on "The Importance of Facilities in Touring," appearing on page 586 of the April 4 issue of THE AUTOMOBILE, Mr. Ellsworth is credited with being the designer of the ingenious arrangement for carrying luggage on a touring car. The honor is due to Dr. Wood McMurtry, an American resident in Paris, who designed this body and put it on the market under the title of "La Routière" touring body. It was Mr. Ellsworth who bought the car from Dr. McMurtry and introduced it into this country.

HAYNES RUNABOUT TO BE 30 INSTEAD OF 50 H.P.

After trying it out very thoroughly, the Haynes Automobile Company, Kokomo, Ind., have concluded not to market a duplicate of the high-speed runabout which was used in the Vanderbilt cup race last, except to order. Instead, they will specialize their 30-horsepower Model S chassis for the same purpose, the 50 having proved to be unnecessarily high-powered for the weight of the car. The new car, which is pictured in the accompanying photograph, is to be termed the Haynes semi-racer. It has practically unlimited speed and climbing power, and, with its great flaring fenders, thoroughly protecting the passengers from flying mud and stones, it is a snappy and serviceable looking car. A rumble seat in the rear is provided on top of the tool box, which is a permanent fixture, beside which there is a rack for a trunk or dress-suit cases. The finish is an attractive gray, set off by black striping.

**HAYNES SEMI-RACER RUNABOUT, 30-HORSEPOWER.**



FARMER'S AUTO, DESIGNED SPECIALLY FOR RURAL RESIDENTS.

AUTOMOBILES FOR THE AGRICULTURIST.

Though looked down upon with a curious and more or less kindly tolerance by the average autoist, the high-wheeler with its square body and abrupt dash, so closely approximating the ideal of horseless vehicle from which the present type of automobile was evolved, has come to stay. More than that, it represents a factor which, in the course of a few years, is bound to become of great importance. It is not too much to say that with the passing of another decade there will be more of this type by far in the hands of users than any other; they will outnumber the cars whose chief distinguishing features are luxury and speed, many to one. A car such as that shown by the accompanying photograph, is hardly as complicated as much of the present-day agricultural machinery used on large farms, and is, in consequence, not alone readily understood by the farmer and his sons, but by the village blacksmith as well, to whom it is bound to be taken once beyond the province of home repairs.

Its makers, the International Harvester Company, Chicago, Ill., know the farmer's needs and the farmer's limitations—better, probably, than he knows them himself—and have borne them in mind throughout the design of the vehicle, which is appropriately called the Farmer's Auto. It is expressly designed and constructed, not only for the rural highways over which it is to be run, but also for the rural owner who is to run it. The motor is a four-cycle air-cooled engine and is of the horizontal, two-cylinder opposed type. It is located centrally under the body in an accessible position. The cylinders measure 5 by 5 inches bore and stroke respectively, and provide ample power to carry the vehicle over the roughest of roads or steep hills at a speed varying from two to twenty miles an hour. Every part is of the most substantial nature; long pistons and an extra heavy crankshaft supported on liberal-sized bearings distinguishing the engine, while one-piece steel drop forgings form the front and rear axles. The valves are all in separate cages and are easily removable for inspection, while lubrication is automatically taken care of by a 10-feed mechanical force-feed lubricator. High-tension ignition is employed, the coil being mounted on the dash in a dust-proof case. The wheels are of the well-known Sarven type and are 40 inches in diameter on the front and 44 inches on the rear; they are shod with 1 5/8-inch solid rubber side-wire tires. The engine lies parallel with the body and drives by a single chain to a countershaft from which the final drive is taken to the rear wheels by double side-chains. Simplicity and accessibility have been studied and the results applied at every point, as is evident from the fact that the transmission is readily removable from the body for inspection or repair; the friction clutch is very simple and dependable and the differential is placed on the countershaft as is done on the most approved heavy types using a side-chain drive. Bronze and steel gears of substantial proportions are em-

ployed, running in amply large and long bearings, while all parts subjected to severe wear are case-hardened. Double elliptic springs are used both front and rear for the suspension.

It is evident from the illustration that while conforming to the farm standard of simplicity and durability, the matter of outward appearance has not been overlooked. The tilted wheel steer and the single-lever control, as well as the slight backward rake given the high-backed seats, give the car a business-like look that is more often lacking in this type of car than not. The seats are comfortably upholstered and finished with Pantasote, the rear seat being made detachable. The regular equipment consists of a pair of headlights and a taillight as well as a horn; the top is extra.

4,000 MILES, WHITE VS. ROLLS-ROYCE.

LONDON, April 20.—Much talk has been going on recently regarding the gauntlet thrown down by Mr. Frederick Coleman, English representative of the White steam car. There can be no doubt that all who are interested in the progress of the motoring industry will watch the performances which the following acceptance of the challenge will bring forth:

To the Editor of "The Daily Telegraph."

Sir—Referring to Mr. Coleman's challenge regarding a 4,000 miles' trial between a 30-horsepower White steam car and a 40-50-horsepower six-cylinder Rolls-Royce car, I think that most of your readers will agree that if the question of steam vs. petrol is to be fought out, no better car can be found to represent the steam interests than the White steam car, and being interested in the manufacture and sale of the six-cylinder Rolls-Royce car, I am naturally delighted that "A Member of the London Stock Exchange," in suggesting this competition, should have selected the Rolls-Royce to represent petrol, and that in the Rolls-Royce, Mr. Coleman acknowledges that he has a fit competitor.

Unhesitatingly I accept Mr. Coleman's challenge, on the understanding that fundamentally the trial is to be a test of trustworthiness, and with a view to deciding which is the better type of luxury-touring carriage.

I should like to be the first to point out in this connection that the selling price of the chassis of the 30-horsepower White steam car is £675, whereas, the selling price of the chassis of the 40-50-horsepower six-cylinder Rolls-Royce is £950, or with magneto, £980.

This difference in selling price will not, I hope, prevent Mr. Coleman from proceeding to formulate a system of classifying results which may be such as will satisfy the champions of both steam and petrol, and which can be accepted by me.

My hope is that we may be assisted in this task by suggestions from your readers, I am, sir, yours, etc.,

CLAUDE JOHNSON.

WALTHAM CARS SELECTED BY POST OFFICE.

Since learning the results of the long and exacting test to which the Orient buckboards were subjected in the rural free delivery service last summer, the Post Office Department has reversed its former decision of not permitting carriers to use automobiles of any nature without special permission, because "they were unreliable and did not serve a route with regularity," and has made one of the Orient 4-horsepower buckboards fitted with special pigeon-hole carriers as used in the tests, a part of its exhibit at Jamestown. In addition to thus upholding the car as typifying the most modern and economical as well as the most expeditious method of making rural deliveries, they have gone further and ordered two of the Waltham 8-horsepower delivery cars with regulation screened mail-wagon bodies, which will be used for transporting mail pouches between the Exposition grounds and the railway and steamship terminals. This approval of the Waltham cars as being representative of a maximum of economy and dependability in service is of much more significance than would appear on the surface, as the step was taken entirely on the initiative of the Government officials and without any solicitation to that effect by the manufacturers, the Waltham Manufacturing Company, Waltham, Mass.

The new Detroit store of the Winton Motor Carriage Company is located at 736 Woodward avenue. The company took possession on May 1.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

A typographical error appeared in the advertisement of the Electric Vehicle Company, printed in the last issue of THE AUTOMOBILE. The price of the Mark XLVIII standard touring car should have been \$3,000, as stated in the current announcement of the same manufacturers.

The Reo Bird which holds the world's mile record for middleweight cars will make its appearance on the track again this spring. The Bird was designed by R. E. Olds, and built by the Reo Motor Car Company, from whose plant it was shipped to California this week. This year it will make its debut on the Los Angeles track during the race meet to be held there May 4.

James Joyce, who recently made public his opinion that a rule should be adopted for the Glidden tour this year looking to the sealing of the bonnets of the cars, has shown that he has the strength of his convictions by being the first to enter a car in the Automobile Club of America's four-day contest, to be run next June, under rules of this nature. He will drive a 40-h.p. Berliet.

On a recent tour through Germany and Austria to the Dolomites in his Winton, Dr. Wm. A. Spring, an American dentist residing in Dresden, visited Oberammergau, where the Passion Play is held every ten years. "We tried to see Anton Lang, who took the part of Christ," writes Dr. Spring, "but he was away, setting up a porcelain stove. We found 'Caiphas' and 'Judas' at home, and they received us very cordially. 'Judas' is said not to like his part."

Blood Bros. Machine Company, of Kalamazoo, Mich., manufacturers of universal joints and steering gears, have again found it necessary to increase their facilities to keep up with the rapidly growing demand. This time they have purchased a tract of land on Ransom street and the South Haven railroad and have moved into the factory buildings that were located there. With the new buildings they are putting up, they expect to have double the capacity for 1908 that they had at the beginning of this year.

That the gasoline truck is coming into its own in New York City is evident when Arnold, Constable & Co., who were pioneers in the adoption of the electric vehicle for delivery purposes, have come around to its favor. They have recently placed an order for four Maxwell delivery cars. What this means in the way of expediting service as well as reducing the cost of delivery, particularly on the heavy item for labor and maintenance, is apparent from the fact that nine electricians now in service permanently displaced 33 horses.

A new tire for motor trucks and commercial motor vehicles, very striking in appearance because it is made of white rubber, and for which much is claimed, has been developed by the Diamond Rubber Company. The tire is made in the well-known side wire type. It is extremely resilient, due in part to the

fact that it is made entirely of new and very elastic rubber. This, of course, is a factor tending to reduce the consumption of power and consequently increases the mileage, particularly that of electric vehicles. All tests indicate that this tire will attract marked interest in the commercial vehicle field.

"Troubleless Touring" abroad evidently appeals to many autoists, for Cecil Hodgman, manager of the foreign touring department of Smith & Mabley, Inc., is being overwhelmed with inquiries from all over the country. Several clients of this department are already enjoying the "Simplex" life on the other side of the pond and a number of Simplex cars have been chartered for the coming summer. The ease and certainty with which such a trip can be undertaken appeals to those owners of cars who do not regard a foreign trip favorably owing to the difficulty of shipping and the formalities involved, while to those of the non-autoing fraternity there is nothing to equal it.

Quite on a par with that story of the man who, failing any gasoline, kerosene, alcohol or sundry other fuel, ran his car home by breathing into the carburetor after taking a cocktail or two, is this one of C. W. Kelsey, formerly sales manager of the Maxwell-Briscoe Company. After the last Vanderbilt Cup race he found the gasoline tank empty with the car stranded in the Long Island woods. However, noticing the condition of the roads which had recently been oiled for the race, resourcefulness, such as automobiling proverbially inspires, came to his aid. It was the work of but a moment to disconnect the suction pipe of the motor and extend it to the road, whereupon cranking immediately started the motor and it ran perfectly on a mixture of —. The next member of the club is requested to step up and tell his.

NEW AGENCIES ESTABLISHED.

An agency for the Reo automobile has been secured in Augusta, Ga., by A. S. Ledbetter, with offices at 524 Broad street.

C. H. Foster, president of the Cadillac Company of Illinois, has been appointed Chicago and Western representative for the French electric automobile Gallia, manufactured near Paris by the Société Electrique des Voitures Gallia.

Arrangements have been made for the handling of the complete line of Waltham touring and runabout cars, also Waltham Orient buckboards, in Northern Indiana and Southern Michigan by the South Bend Automobile and Garage Company, at 228 South Lafayette street.

The Fawkes Auto Company, formally opened its new establishment on West Sixth street, St. Paul, Minn., last week. M. E. Woods, who formerly managed the local branch of the company when it had an establishment in Fifth street, will be the manager of the new place. The concern handles the Rambler, National,

Glide and Holsman gasoline cars and the National electrics.

The Acme Motor Car Company, of Reading, Pa., which was recently reorganized, has started on an aggressive sales campaign. Up to the present the following agencies have been appointed: Scull-Morris Motor Company, Philadelphia, Pa.; Boston Motor Company, Boston, Mass.; Theo. E. Schulz, New York City; Standard Motor Car Company, San Francisco, Cal.; John M. Larsen, Chicago, Ill.; F. W. Kavanaugh, Troy, N. Y., and central portion of New York State; Pecos Auto Company, Pecos, Texas, and vicinity.

PERSONAL TRADE MENTION.

J. L. Straub, secretary-treasurer of the J. S. Bretz Company, of New York City, will sail for Europe early in May. While abroad Mr. Straub will visit the factory of Fichtel & Sachs at Schweinfurt, Germany, manufacturers of the F. & S. annular ball bearings.

John E. Miller has been appointed superintendent of the works of the Deere-Clark Motor Car Co., Moline, Ill. Mr. Clark has a reputation for surrounding himself with strong men and this latest appointment adds to his record. Mr. Miller has been actively engaged in the manufacture of automobiles for a number of years.

The J. S. Bretz Company, of New York City, have secured the services of Harry J. Porter, of Rochester, N. Y., who will make his headquarters in Detroit and will cover the Western territory in the interests of the F. & S. annular bearings, Hartford universal joints and other lines the sale of which the Bretz Company controls.

Burton Parker, advertising manager of the Fisk Rubber Company, Chicopee Falls, Mass., is going the rounds of the principal branch offices of the company to obtain material for the "Pneus," the entertaining and instructive booklet that the company issues monthly. Copies are sent gratis on application to anyone interested in tire lore and the newest things in the field of rubber.

A. F. Justin has resigned as manager of the Penn Auto Supply Company, of Philadelphia, to take charge of the Providence branch of the Angier Company. The latter's establishment in that city has just been remodeled and enlarged, giving double the amount of floor space formerly used. In addition to the regular lines of automobile supplies, motor boats and boat supplies have been added.

F. L. Thomas, formerly local sales manager for the H. H. Franklin Manufacturing Company at Syracuse, has accepted a position as branch manager at Chicago for the Franklin Automobile Company. Mr. Thomas is well known in the automobile trade, having been associated with the Fredonia Manufacturing Company and also held the position of branch manager for the Knox Company at Buffalo.

INFORMATION FOR AUTO USERS.

The Breech Block Plug.—There are few things more exasperating than to have a plug that has gone wrong stick in the cylinder and refuse to budge despite every effort that can be brought to bear to get it out and particularly in the case of single and two-cylinder cars as



THE BREECH-BLOCK PLUG AND ITS CLIP.

further progress is impossible. With the Standard breech block plug, made by The Standard Company, Torrington, Conn., it is possible to remove and clean four plugs and return them in the space of sixteen seconds by the watch. It is especially valuable on old cars not provided with compression relief cocks in the cylinder heads, as it provides a means of injecting kerosene with equal convenience. It has numerous other advantages in addition, not the least of which is its round enclosed end preventing a cracked or chipped porcelain from falling into the cylinder and doing expensive damage. This protection also prevents burning off the glazed end of the porcelains and renders them easy to clean and long-lived. In connection with the "Breech-Block" clips, which snap the connecting wire onto the plug end in a jiffy, the breech block plug is a combination that is hard to beat for convenience and all round handiness.

Puncture Proof Tires.—The recently organized Akron Pneumatic Tire & Protector Company, Akron, O., is now placing on the market a new puncture proof tire and an extensible tread pneumatic



GREENWALD EXTENSIBLE TREAD TIRE.

tire, both of which are the inventions of L. Greenwald, formerly superintendent of the repair department of the Goodrich Rubber Company's works. The extensible tire is built on a new principle in

that it is designed to take the sudden heavy pressure caused by the tire striking an obstacle on the rubber instead of the fabric, thus preventing ruptures. This is provided for by a so-called hinged portion in which the fabric is omitted and replaced by rubber, which also permits the tire to have a greater heat-radiating capacity. This plan of building up the tire, which is shown by the accompanying illustration, Fig. 1, is also claimed to permit greater compensation for different loading than ordinary tires. The puncture proof type of tire is shown in Fig. 2; the tire is rendered impermeable by means of three layers of copper-plated steel discs placed in strata of rubber in such a manner as to present a



GREENWALD PUNCTURE-PROOF TIRE.

practically continuous band, this also making the protector of a very flexible nature, so that it does not interfere with the resiliency of the tire. This protector is so made that it can be interposed between the outer case and the inner tube, so that it may be readily removed whenever desired. Mr. Greenwald, who heads the new company, has also devised a reinforced inner tube with a fabric envelope designed to eliminate pinching by the clips or beads, which will also be manufactured. An active demand for its products is reported.

Stewart Speedometers.—Automobile manufacturers are not alone in taking time by the forelock by getting their 1908 models on the road ten months ahead of time. The Stewart & Clark Manufacturing Company, 502 to 520 Diversey boulevard, Chicago, announce that having booked orders for all the 1907 models of the Stewart speedometers that they can possibly turn out, they are now booking orders for the 1908 model, which will be made in four styles, 50-mile, 60-mile, 90-mile and 120-mile dials. This series will be fitted with the new swivel joint, which permits the flexible shaft to be carried straight back along the frame to the dash without the necessity of passing through or under the springs, thus doing away with the right-angle construction usually required, which adds a most attractive feature to the Stewart.

The accompanying illustration reveals the internal construction of the new 1908 model. The spindle or central shaft is made of selected steel hardened and ground and is mounted on ball bearings. An exceptionally long coiled spring of large diameter is employed to return the

indicator hand to the starting point. The steel shoe for moving the indicator is made file-hard. Every part is of the most substantial construction, thus insuring long life. The bevel gear angle-joint on



MECHANISM OF THE STEWART SPEEDOMETER.

the instrument permits the flexible shaft to be carried down close alongside the dash and in connection with the new swivel joint makes the Stewart installation on the car an ideal one in every respect.

The Auto Light.—Considering that the car has always carried the necessary battery and coil equipment for electric gas lighting, it seems strange that some inventor has not taken advantage of them to apply it to the lighting of the acetylene headlights long ago. It has remained for the Rolfe-Fox Company, Livingston Building, Rochester, N. Y., to provide

such a device in the shape of the Auto Light, by means of which it is only necessary to turn on the gas and press a button in order to start the headlights—a decided convenience on blustering and rainy nights. The only apparatus involved is shown in the accompanying illustrations—a jump spark igniter to be placed on the acetylene burner and a flexible cable leading back to the dash or other



DETAILS OF THE AUTO-LIGHT.

convenient place where the push button is located; the rest is merely a matter of making the proper connections.

A Quarterly Calendar.—From the Winton Motor Carriage Company, Cleveland, is to hand a quarterly hanging calendar, well designed and produced, showing the various types of Winton machines from the early days of 1896 to the present date.